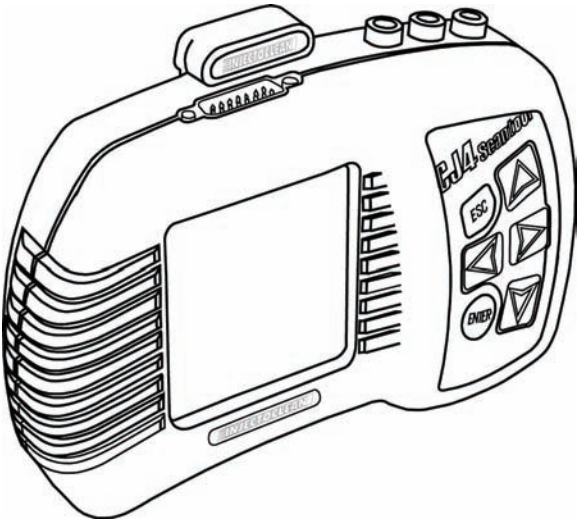
CJ-4

Scantool/Oscilloscope

User Manual



CJ4 0000GEN/05A07/ENG

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INTRODUCTION

New technologies implemented in automobiles and the necessity to diagnose this vehicles has encouraged **Injectronic** to take the initiative of developing new equipment to satisfy this needs.

As the result of a series of marketing investigations, the search for high quality and reliable components, as well as skilled manufacturing process from design, engineering and production, surges a final product, the **CJ4 Scantool/Oscilloscope** automotive diagnostic equipment.

The **CJ4 Scantool/Oscilloscope** with its scanning capacity, generic OBD II, EOBD and CAN plus the Labscope feature, is ready for most vehicles in circulation on countries around the world. In addition, the expansion port accepts optional cartridges that allow the **CJ4 Scantool/Oscilloscope** to perform diagnostics in vehicle specific mode and special functions like the optional Fuel Injector Tester. And to complement this features, the **CJ4 Scantool/Oscilloscope** supports an optional Battery Tester to make a complete and thorough diagnostic.

Furthermore, the integration of the oscilloscope for testing all electronic automobile systems and ease of operation, characteristic of **Injectoclean** equipment, gives you added functionality.

As always, **Injectronic** appreciates your preference, and invites you to read this user manual carefully so that you can take full benefit of your **CJ4 Scantool/Oscilloscope**.

GENERAL DESCRIPTION.

Characteristics:

- 128 x 128 pixel resolution, illuminated screen, for better visibility outdoors.
- Integrated 2 channel oscilloscope.
- Optional cartridges for wider coverage and additional applications.
- Graphs live data parameters.
- No batteries required.
- Updateable via Internet/PC.

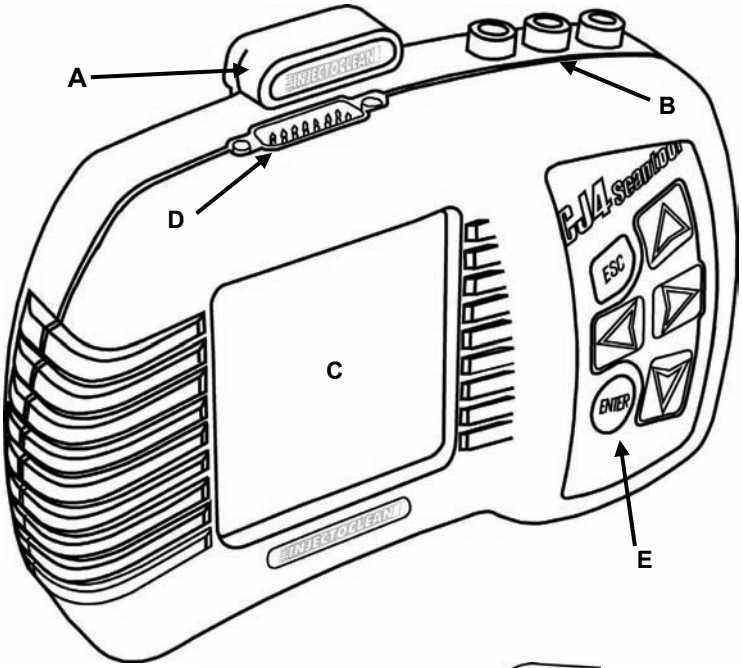
Functions:

- Retrieve permanent and pending trouble codes.
- Code description of most vehicle-specific trouble codes.
- Erase trouble codes from computer memory and turn off the MIL indicator (Check Engine).
- Display Freeze Frame data, captured when a fault code is set.
- Live data parameters displayed in digital format.
- Graphs live data parameters.
- Monitors Emission control system parameters.
- Digital Voltmeter.
- Oscilloscope with single or 2 channel option.
- Double cursor on graphs.
- Screen Shots.
- Multi-language application.
- Stand alone or PC/Laptop interface modes.
- USB and Serial communications supported.
- Compatible with our 4514 Battery tester.

SPECIFICATIONS.

- **SUPPORTED SYSTEMS:**
  OBD II.
- **PROTOCOLS**: CAN
  ISO 9141
  J1850 PWM
  J1850 VPW
  ISO 14230-4
  SCI
  CCD
- **DIMENSIONS:** 18.7 cms. x 11.15 cms. x 5.60 cms aprox.
  (7.40" x 4.40" x 2.20" approximate)
  (CJ4 housing, no cables or module).
- **WEIGHT:** 350 gms. (12.35 Oz.) Approximate
  (CJ4 monitor, no cable).
- **SCREEN:** 128 X 128 Pixels.
- **TROUBLE CODES SUPPORTED:**
  P, B, C, U.
- **OSCILLOSCOPE:** 2 Channel
  500 Mhz samples
  0 to 20 volts scale
- **LANGUAGES:** English-Spanish, others optional.
- **UNITS OF MEASURE:**
  English/Metric
- **EXPANSION PORT:**
  Yes
- **MODULES:** Optional, 2 to 16 MB memory with specific and special applications.
- **POWER:**
  Self-powered when connected to Data Link Connector on vehicle.

LOCATION OF MAIN FEATURES ON THE CJ-4.



Bottom view

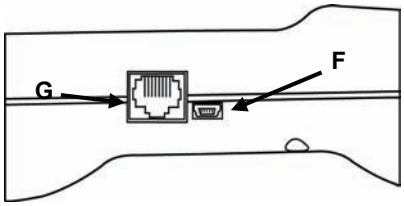
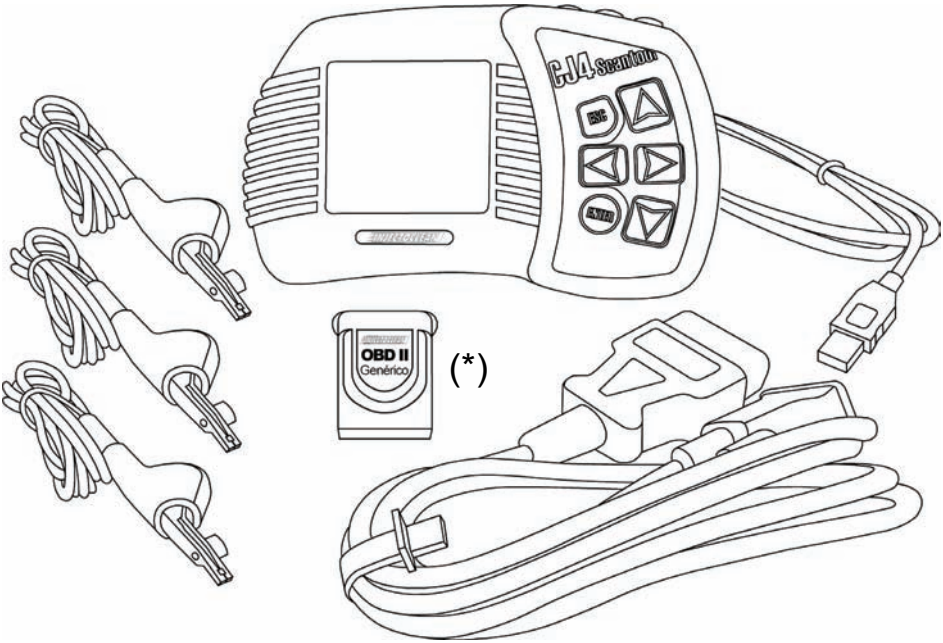


Fig. 1

A) Memory cartridge for applications/specific functions (OPTONAL).
B) "Banana" type connectors for test leads used with the Oscilloscope function..
C) 128 x 128 Pixels screen, with integrated illumination.
D) DB15 connector, for OBD II cable assembly.
E) Membrane type Key pad with 6 pressure sensitive buttons.
F) USB type connector for PC/Laptop connectivity.
G) Serial type connector for PC/Laptop connectivity.

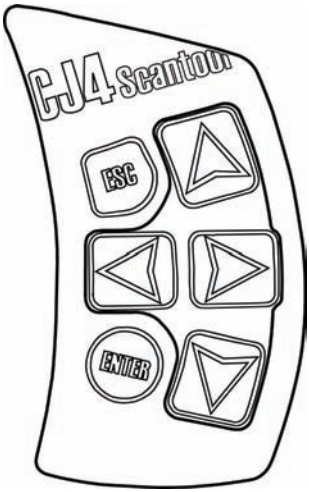
CONTENTS in storage case:

- CJ-4 Scantool.
- User Manual.
- OBD II cable.
- USB cable for PC connection.
- Serial cable for PC connection.
- High impact plastic storage case.
- Oscilloscope cables (3) with alligator clips and test probes.



(*)NOTE: Memory cartridges with specific or special applications are optional and are <u>not included</u> with the CJ4 package.

KEY PAD.



Key Functions

ESC (Escape):
Returns to previous step / screen.

ARROWS:
Allow; up, down, left or right movement and scrolling in menus.

ENTER:
Press after making a selection in a menu and to freeze readings.

VEHICLE COMPATIBILITY.

The CJ4 Scantool is capable of communication with Domestic, Asiatic and European vehicles that conform to the OBD II standard.

CAN communication is included, introduced to the market in 2003 and will be required on 100% of vehicles sold in the US starting in the year 2008.

The CJ4 integrates the EOBD diagnostic system used in Europe and other countries since the year 2000.

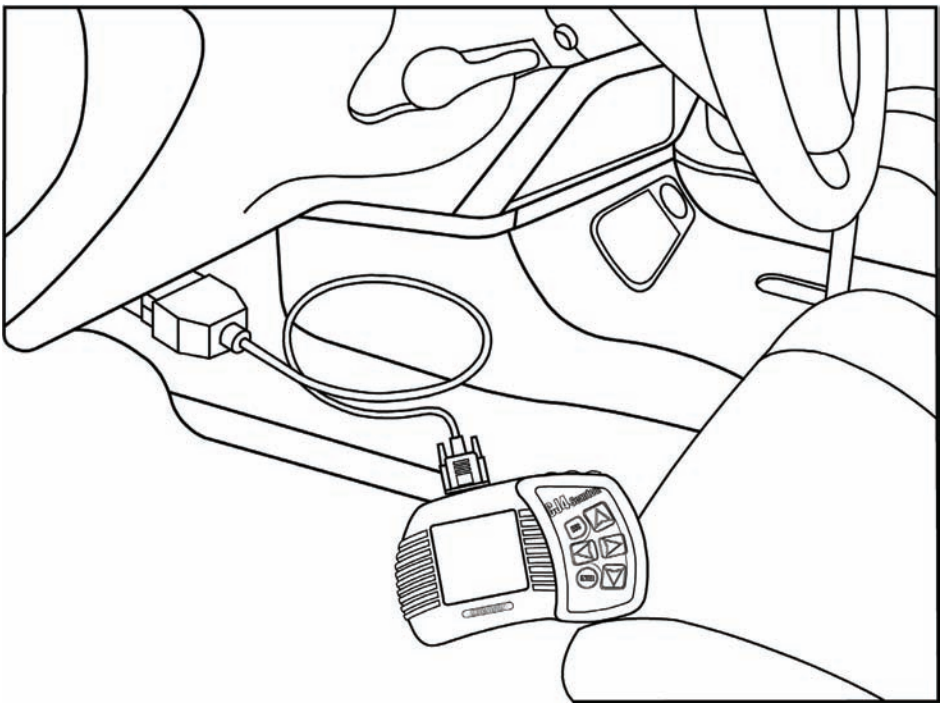
CONNECTING THE CJ4

-FIRST plug in the matching end of the OBDII cable to the DB-15 connector in the CJ4 (located in the upper side of the CJ4) See fig.#1 (D). Taking care to guide the cable end **straight** into the CJ4 to prevent damage to the pins or the receptacle. Tighten the screws evenly using finger force only.

-Locate the Diagnostic Link Connector (DLC) under the dash in the vehicle, usually at the left or right of the steering wheel. Consult the vehicle owners manual or service manual for exact location.

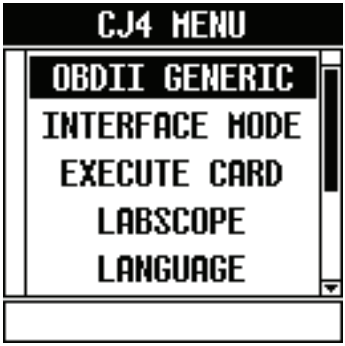
-Plug the OBDII end of the cable to the DLC.

-The CJ4 should be energized and display the “CJ4 MENU”, turn ignition key to the ON position.



MAIN MENU OPTIONS.

Once the CJ4 has turned on, the screen will show the main menu for the CJ4's functions with the following options:



OBDII GENERIC:

Allows diagnostics on OBDII in generic mode, CAN protocol and EOBD systems.

INTERFACE MODE:

This function allows the CJ4 to enter into a communication interface mode between the vehicle and a PC, Laptop or a PDA. Support for serial, USB and wireless Bluetooth options.

EXECUTE CARD:

With this function the CJ4 Scantool increases its diagnostic power when using special applications integrated into optional cartridges that are inserted on the upper back side of the equipment.

LABSCOPE:

The incorporated oscilloscope option allows viewing in real time, wave forms of positive values of electrical signals, necessary to analyze the impulses received and sent by control units, sensors and actuators of automotive electronic systems.

LANGUAGE:

Change the language, English / Spanish, of the CJ4 Menu, the OBD II Generic submenu and functions, also the Extras menu will be affected by the change. Other menus and functions have their own option to change language. Refer to each submenu function for instructions.

BATTERY TESTER:

The CJ4 is ready to make use of the Injectoclean/Midtronics 4514 Battery Tester. In just a few minutes you can obtain accurate analysis on battery condition, starting and charging systems, crucial for the operation of the vehicles electronics.

SCREENSHOTS:

This option allows viewing of stored screenshots in the CJ4 Scantool.
This feature allows you to review, save and delete stored screenshots without the need to use a PC. Use the CJ4 Screenshot Tool and Screenshot converter to transfer, save and customize screenshots in your PC.

INFO CENTER:

ACRONYMS:

In here you can look up the full description of most common acronyms used in automotive diagnostics, components and systems. If more then one description applies, they will be displayed in the same window.

CONNECTOR FINDER:

OBD2 Diagnostic Link Connector (DLC) location of approximately 1600 models is accessible here, Select make, model and year then, text and a graphic appear in the screen to guide you to the location.

LANGUAGE:

You can select the language for the acronyms and connector finder functions.

EXTRAS:

When updates become available for the CJ4, there may be added extras from time to time. This extras may include a basic vehicle application or function that complements the operation and functionality of the CJ4. Most, if not all of this extras will be included in the update at no cost, FREE.

NOTE:

The CJ4 is capable of capturing screenshots from the following functions: OBDII Generic, Labscope, Battery Tester and from the Info Center's Acronyms and Connector Finder.

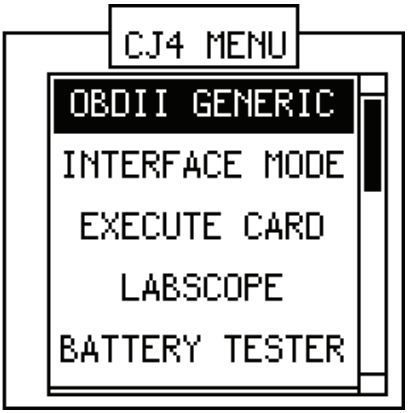
While on OBDII Generic, Battery Tester and Info Center functions, press and hold the DOWN key for about 2 seconds to capture the screen.

For the Labscope function, press and hold the LEFT and RIGHT arrow keys at the same time for about 2 seconds to capture the screen.

Refer to the Screenshots section for instructions on the options available to manage the captured screenshots.

DIAGNOSTICS.

Once the CJ4 has been connected to the vehicle and the Main Menu is visible, the “OBDII GENERIC” option will be highlighted, press “ENTER” to access the Scantool functions of the CJ4.



In the next screen, you can see what firmware version is installed.

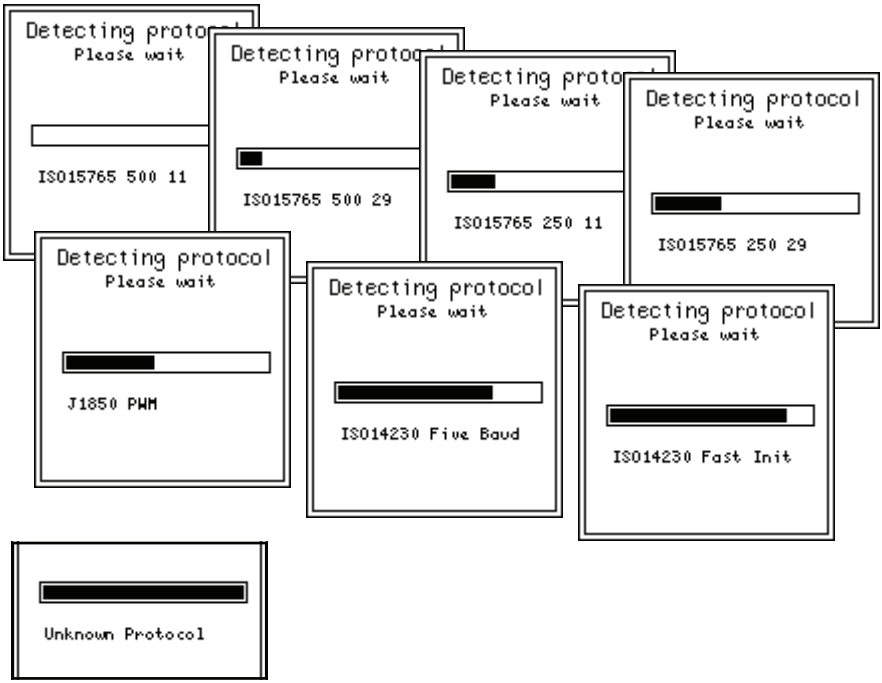
Press “ENTER” to continue.

NOTE: **Regularly visit the Injectronic website for the latest firmware and updates available.**

After pressing “ENTER” the CJ4 will automatically detect the protocol on that vehicle, once the correct protocol is found, communication will be established and the diagnostic will start.

The CJ4 has the capacity to retrieve data from the following protocols; CAN, ISO 14230 Fast Init, ISO 9141, J1850 VPW, J1850 PWM.

The protocol detection is visible with the protocol name and search bar representation. As the search progresses, the horizontal bar will “fill” and once the correct protocol is found, the search stops and communication will start.

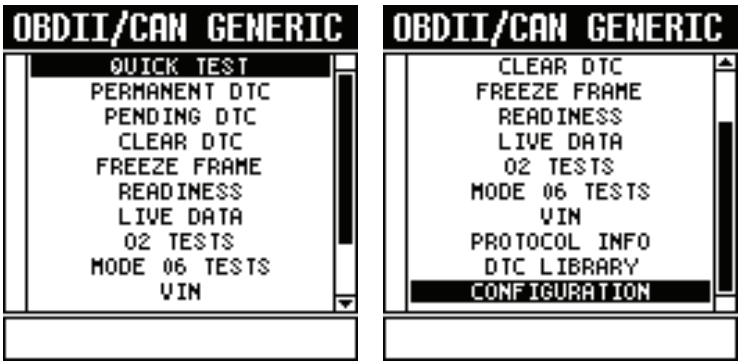


If the CJ4 cannot detect a protocol, “Unknown Protocol” will appear in the screen. Retry doing the following;
-Disconnect the DLC connector from the vehicle,
-Disconnect and reconnect the cable at the CJ4 connector,
-Reconnect to the vehicle DLC.

If there is still no detection of protocol, check for the following;
-Faulty DLC connector or damage to wiring in vehicle.
-Refer to service manual for other causes.

Once communication has been established, the menu for generic diagnostics will be shown in the screen.

OBDII/CAN GENERIC MAIN MENU.



To navigate through the options, press the up or down arrow keys then press "ENTER".

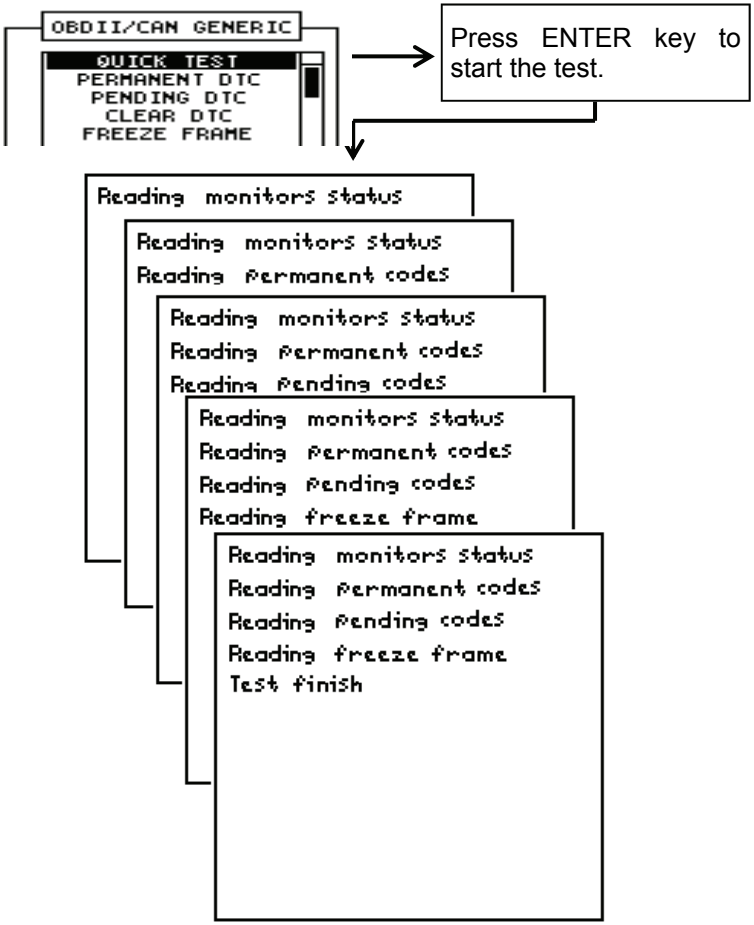
-QUICK TEST.

The CJ4 integrates this test that permits a fuel injection system diagnostic in a matter of seconds. This type of diagnostic is convenient as part of routine service, or as preventative maintenance with very low labor involved and practically no cost.

The information provided by the CJ4 Scantool cover the primary data needed to begin a diagnostic:

- Monitors
- Permanent fault codes
- Pending fault codes
- Freeze Frame data

Selecting the Quick Test option for OBDII/CAN Generic in your CJ4 is the first function in the diagnostics menu. Since this option is already highlighted just press “ENTER” to start executing the automatic series of tests.

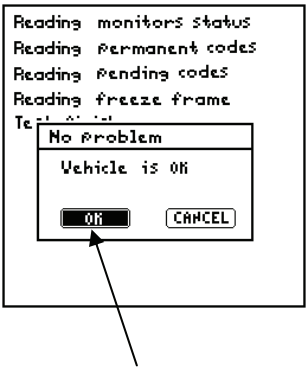


NOTE: *Due to the quickness of the diagnostic, some of the screens won’t be visible long enough to appreciate the information.*

At the end of the diagnostic, a second window will open with either a; **Problem detected** or **No Problem** test result.

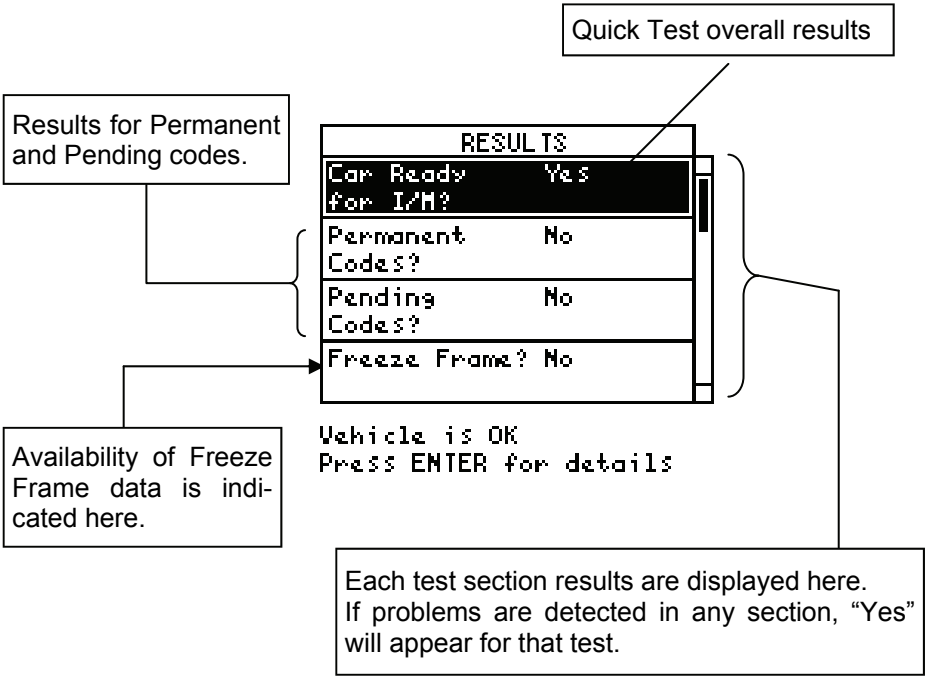
The CJ4 Scantool considers a **No Problem** result if:

- No Permanent codes
- No Pending codes
- No Freeze Frame data
- Monitor Status is OK



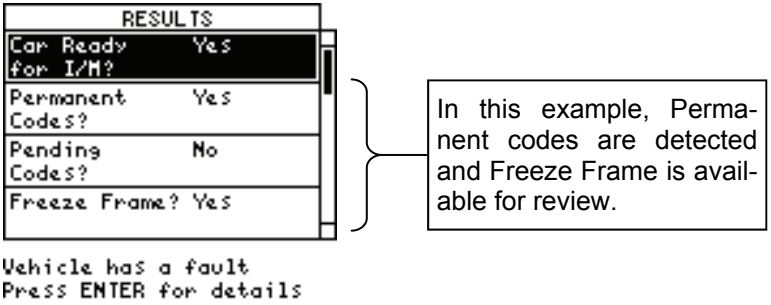
This is an overall test of systems and main components, to detect a problem or display indication of saved data in the vehicle's computer.

In the result window there are 2 buttons, the "OK" button is highlighted automatically, pressing it will reveal the individual results of the tests:


Quick Test overall results
Results for Permanent and Pending codes.
RESULTS
Car Ready for I/M? Yes
Permanent Codes? No
Pending Codes? No
Freeze Frame? No
Vehicle is OK
Press ENTER for details
Availability of Freeze Frame data is indicated here.
Each test section results are displayed here.
If problems are detected in any section, "Yes" will appear for that test.

If the results of the Quick Test find a problem the **Problem Detected** message will show on the secondary window:

Pressing the “ENTER” button will show the individual test results, allowing you to view where the problem(s) was detected.


RESULTS
Car Ready for I/M? Yes
Permanent Codes? Yes
Pending Codes? No
Freeze Frame? Yes
Vehicle has a fault
Press ENTER for details
In this example, Permanent codes are detected and Freeze Frame is available for review.

You can review the results for each of the tests. Each test is performed like if it was done manually, so pressing “ENTER” on any particular block will display results for that test. For example: if you press “ENTER” when the Permanent Codes block is highlighted, the number of codes and their description will be displayed.

Press “ENTER” on any of the other blocks to display the results for each.

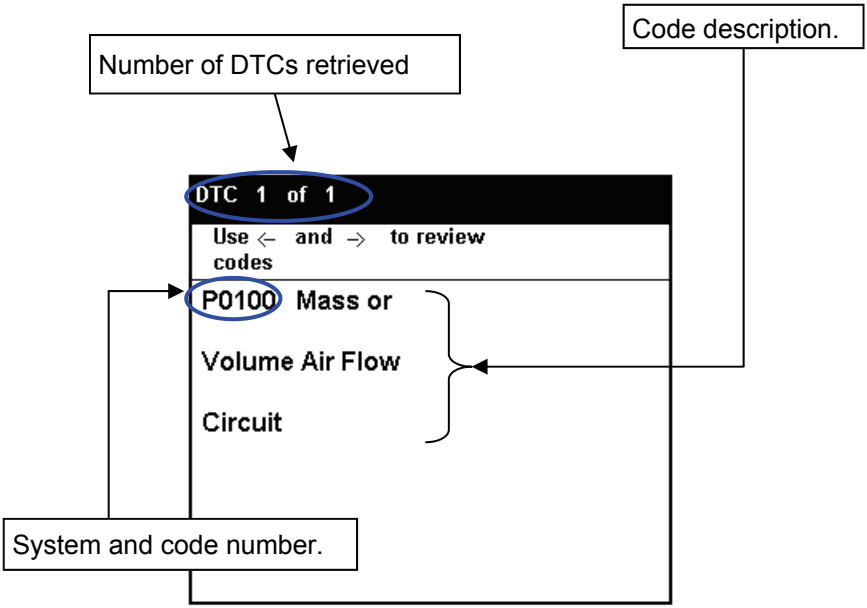
- Permanent codes (page 14)
- Pending codes (page 17)
- Freeze Frame (page 19)

The bottom of the screen displays a Help message.

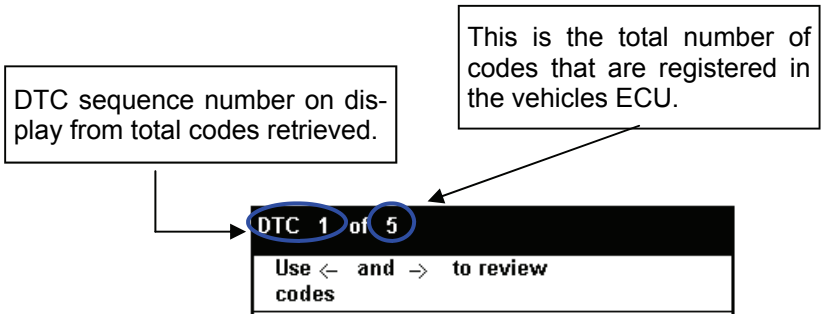
-Permanent DTC.

This function displays Permanent trouble codes (DTC) captured in the vehicle's computer.

The following screen will display DTCs and their description:



If more than one code is retrieved from the computer, the top of the screen will show the following information:

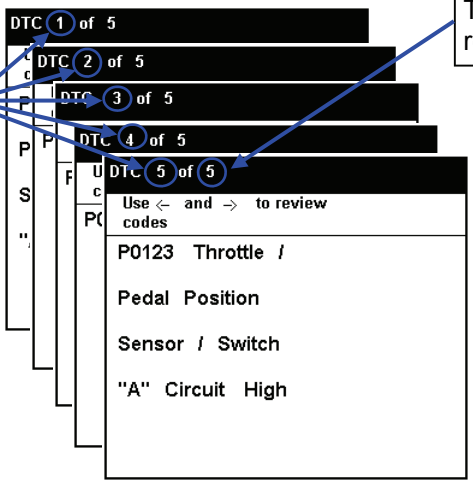

This is the total number of codes that are registered in the vehicles ECU.
DTC sequence number on display from total codes retrieved.
DTC 1 of 5
Use ← and → to review codes

To be able to see all the codes retrieved, press the RIGHT arrow key to display each one, in ascending sequence.

The left and right arrows indicate that it is possible to scroll through all of the retrieved codes.

Sequence position of the code in display.

Total number of retrieved codes.


DTC 1 of 5
DTC 2 of 5
DTC 3 of 5
DTC 4 of 5
DTC 5 of 5
Use ← and → to review codes
P0123 Throttle / Pedal Position Sensor / Switch "A" Circuit High

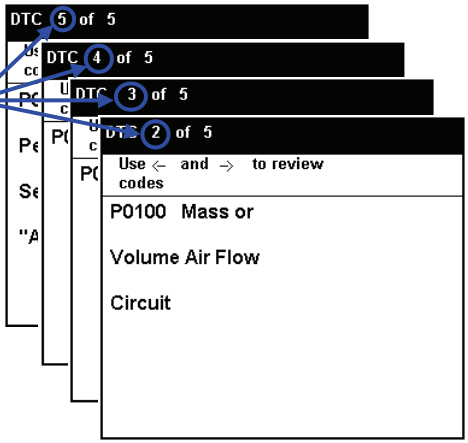
To see each code one by one, press the RIGHT arrow key then the next available code in the sequence is displayed. This is done in an ascending manner. Press the RIGHT arrow key once for each code.

Description of the code is displayed in each screen.

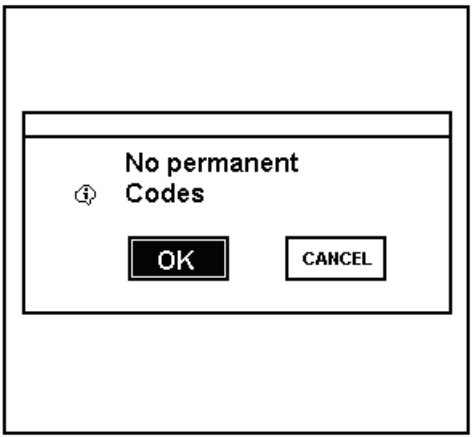
To review previous codes in the sequence simply press the LEFT arrow key. Each time that you press it, the screen will show the code number and description of the codes in descending sequence.

Pressing the RIGHT or LEFT arrow keys will not delete or retrieve more codes.

Pressing the LEFT arrow key returns to a previous code in a descending manner.



If when the Quick Test was performed there were no codes stored in the vehicle's ECU, the following screen will be displayed:

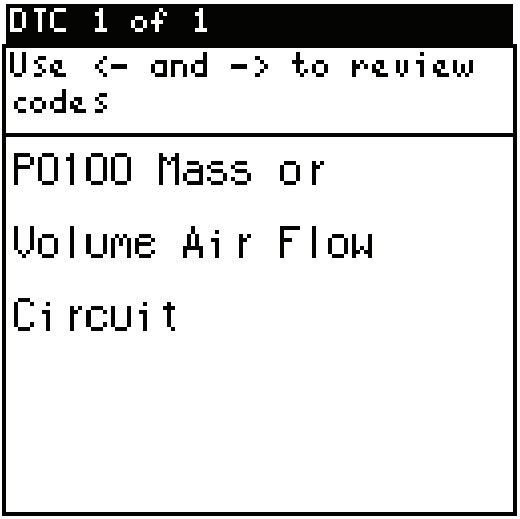


The "OK" button will be selected by default, press the "ENTER" button in the key pad to exit from this screen and return to the diagnostic menu.

-Pending DTC.

This option allows you retrieve any codes that are stored in the vehicle's computer but have not set the MIL light on. An intermittent problem or an operating malfunction may have been detected by the computer for a short period of time but it did not re-occur again or if it did, it was not constant or severe to trigger a Permanent code.

If a malfunction is constant or severe and the MIL light stays on, then it becomes a Permanent code.

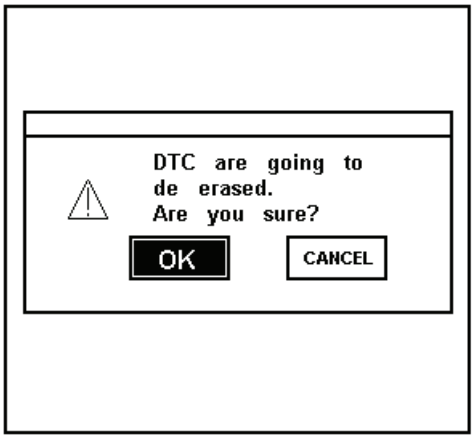


If more then one Pending code is registered, you can review the codes in the same manner that for Permanent codes, by pressing the RIGHT and LEFT arrow keys.

-Clear DTC.

The CJ4 can clear Permanent and Pending codes captured by the vehicle computer. Also, the Check Engine light will be turned off. Normally this is done after the cause of the trouble code(s) has been repaired.

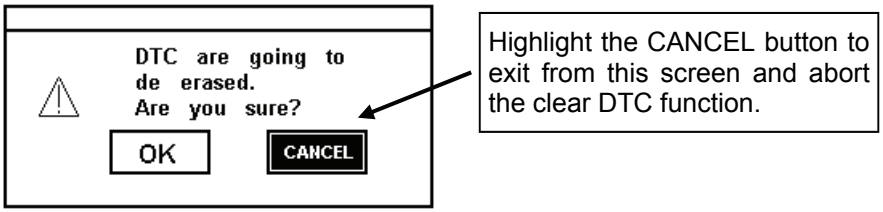
In the Main menu, highlight the “Clear DTC” option and press the “Enter” button in the keypad of the CJ4 and the following screen will appear:



By default the “OK” button is highlighted, pressing “ENTER” in the keypad will erase all DTCs stored.

Note: ***When clearing codes from the vehicle memory, you erase freeze frame data and the vehicles adaptive memory is cleared also.***

If you are not sure that you want to loose this data, press the RIGHT arrow key to highlight the “CANCEL” button and then the “Enter” key. Doing this will take you back to the Diagnostic Main Menu.

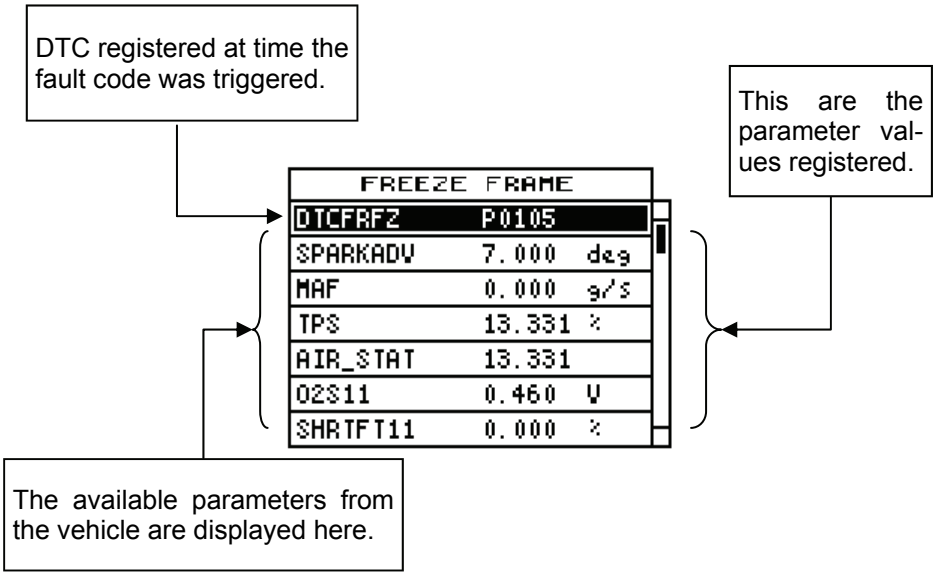

DTC are going to
de erased.
Are you sure?
OK
CANCEL
Highlight the CANCEL button to exit from this screen and abort the clear DTC function.

-Freeze Frame.

The Freeze Frame function displays the operating conditions of the vehicle at the moment that a fault code is triggered and the code is recorded.

The information available in the Freeze Frame screen depends on what is available by the manufacturer, and it varies by vehicle make and model.

General information includes; engine RPM, engine temperature, engine load, vehicle speed, fuel trim and systems status.


DTC registered at time the fault code was triggered.
This are the parameter values registered.
FREEZE FRAME
DTCFRFZ P0105
SPARKADV 7.000 deg
MAF 0.000 g/s
TPS 13.331 %
AIR_STAT 13.331
O2S11 0.460 V
SHRTFT11 0.000 %
The available parameters from the vehicle are displayed here.

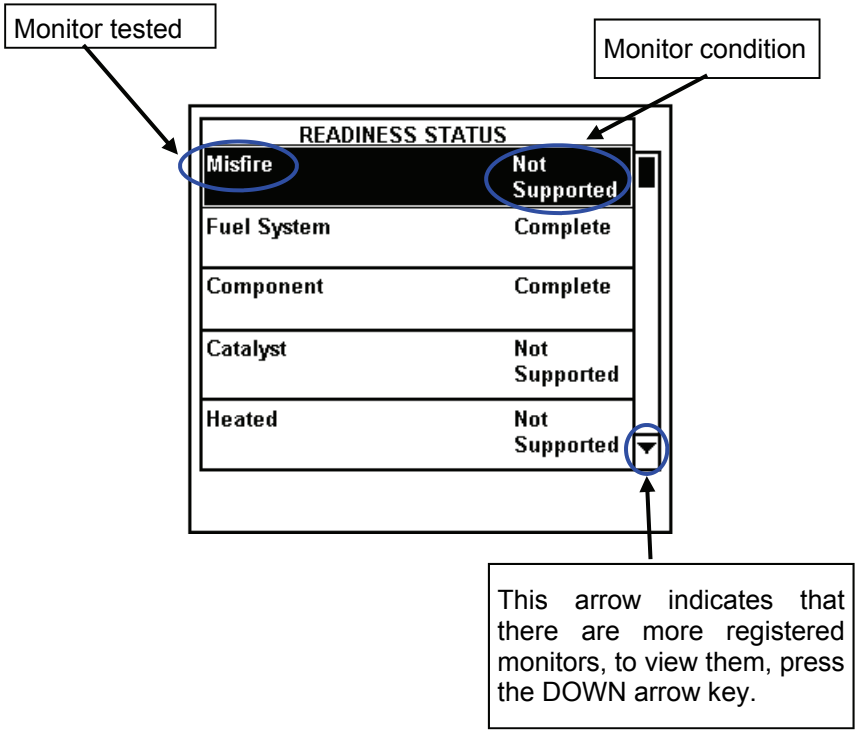
-Readiness.

The Readiness Status function analyzes the emission control system, this system is constantly supervised by the Engine Control Module, it's purpose is to determine that all the emission components are functioning properly and the monitoring cycle is complete.

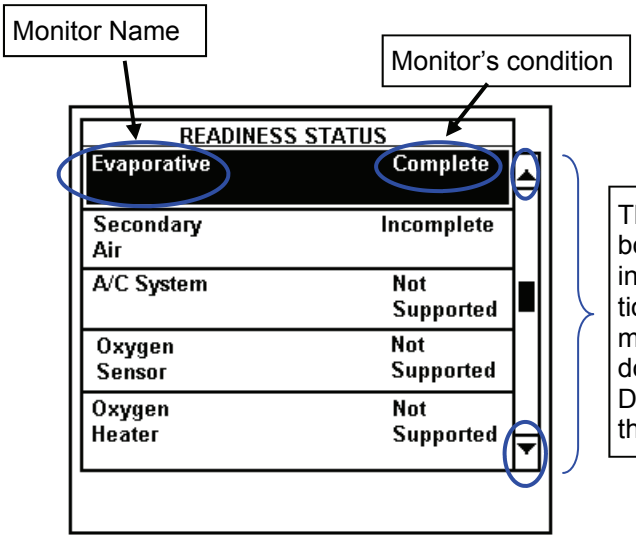
Emission control monitors functioning depends on the test results executed by the ECM. This can determine if the test was Complete, Incomplete or is Not supported.

Availability of monitors is dependent on the design of the fuel injection system in the vehicle.

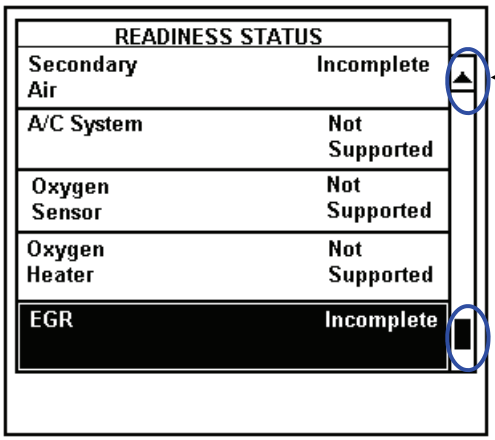
In the Diagnostic Main menu highlight "Readiness" and press "Enter", this screen will be displayed:



To see more available monitors in the vehicle, press the Down arrow key and more monitors will appear


Monitor Name
Monitor's condition
READINESS STATUS
Evaporative
Complete
Secondary Air
Incomplete
A/C System
Not Supported
Oxygen Sensor
Not Supported
Oxygen Heater
Not Supported
The arrows on top and bottom of the scroll bar indicate in which direction are more available monitors. To move up or down use the Up and Down arrow buttons in the key pad.

When you scroll up or down another monitor will be highlighted, when you get to the bottom or top, only one arrow will show in the scroll bar.

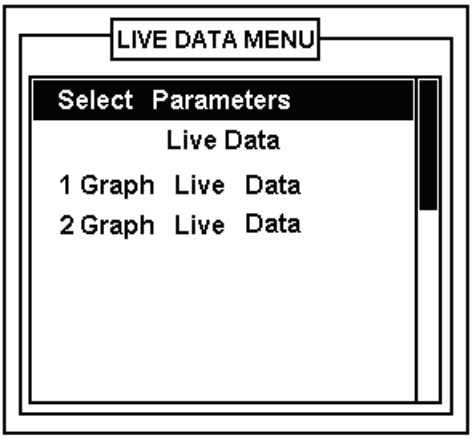

READINESS STATUS
Secondary Air
Incomplete
A/C System
Not Supported
Oxygen Sensor
Not Supported
Oxygen Heater
Not Supported
EGR
Incomplete
In this example we have reached the last monitor at the bottom, notice that only an arrow at the top of the scroll bar is present. Press the Up arrow key to return to the top, while doing this, an arrow at the bottom of the bar will appear again.

You can return to the diagnostics main menu at any time by pressing the "ESC" key in the CJ4.

-Live Data Menu.

Live Data allows visualization of all available parameters from the engine control systems, such as: engine RPM, TPS, charge percentage, etc. All parameters are displayed in digital format.

To access this function, press the Enter key when you are in the diagnostic main menu. The following menu will appear on the screen:



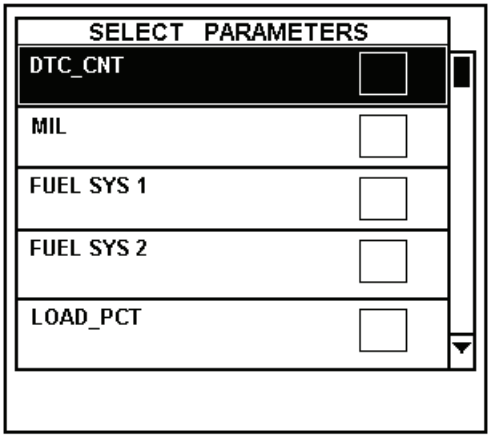
The following options are available in this function:

- **Select Parameters**
- **Live Data**
- **1 Graph Live Data**
- **2 Graph Live Data**

-Select Parameters.

This option permits you to select the parameters that are most important to you or for the diagnostic being performed. The amount of parameters depend on the total available from the vehicle. This reduces the time needed for the diagnostic by having less parameters to search through.

The default option on the Live Data menu is Select Parameters, press the Enter key on the pad and the following screen will appear.

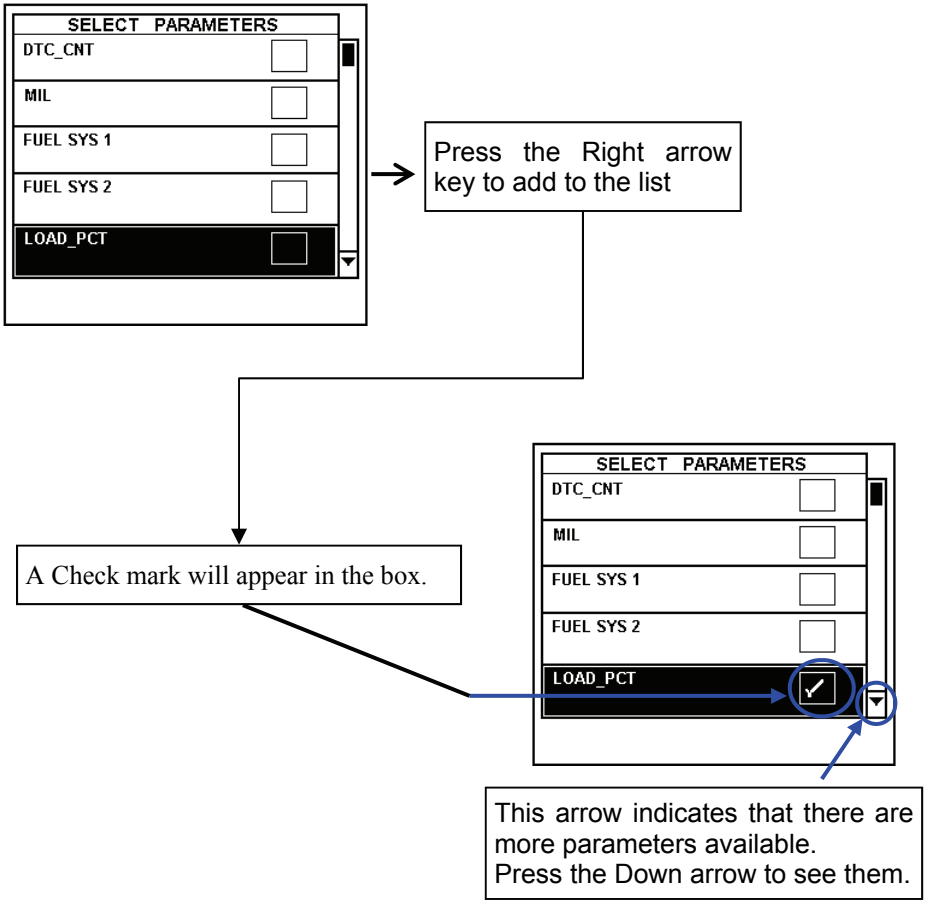


As an example, you only want the following parameters:

- LOAD_PCT
- MAP sensor
- Engine RPM
- MAF sensor
- O2S11 (Oxygen sensor 1 Bank 1)

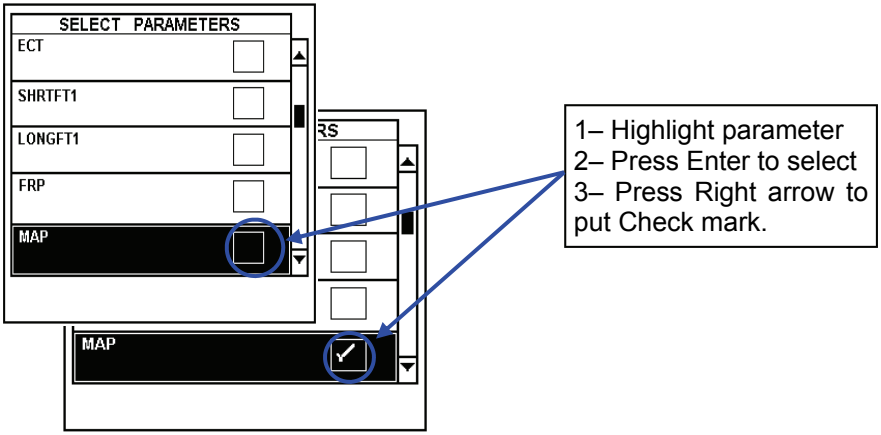
The next steps will guide you through the process;

To select the first parameter, LOAD_PCT, use the Down arrow key to highlight that block, then

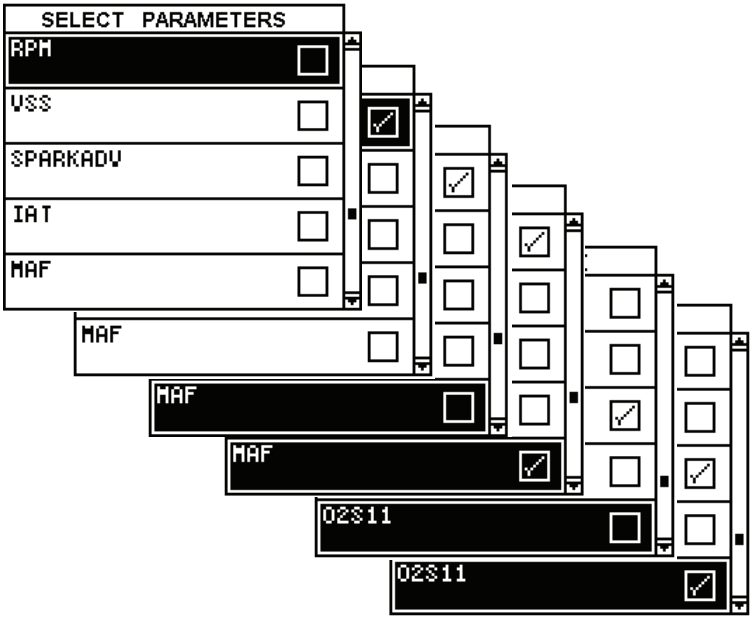


The next parameter to select is the MAP, press the Down arrow until it is visible.

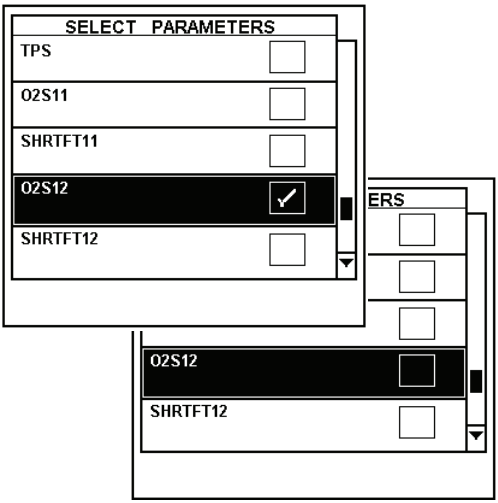
Once the block has been highlighted, press “Enter” to add to the list then press the Right arrow key to put a Check mark.



Repeat same steps for every parameter that you want to include in the list.



If you made a mistake or don't want a parameter after all, scroll with the arrow keys to the desired parameter and press the LEFT arrow key, the check mark will be taken off and that parameter will not be in the list.



To delete a parameter from the Live Data list,
1– Highlight the parameter,
2– Press the LEFT arrow key,
3– The check mark is cleared.

Once you have selected the parameters that will be shown on the list, press ESC in the keypad. The screen will go back to the Live Data display then, press the Down arrow key to highlight "Live Data" and press ENTER key to start viewing the selected parameters.

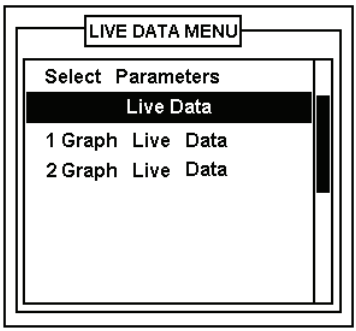
-Live Data.

With Live Data you can view values and engine operating conditions and systems that provide data under the generic standard.

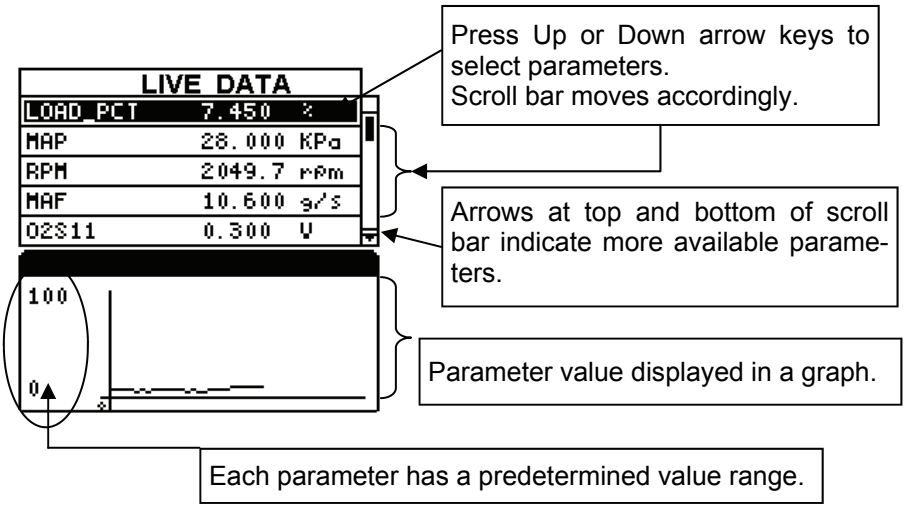
The CJ4 has the capacity to interpret up to 104 live data values. The values displayed are dependent on the vehicle, in other words, the amount and availability of such information varies by manufacturer and vehicle model.
All available parameters displayed are viewed in real time.

The CJ4 screen displays the parameter name, value and a simultaneous graph of the parameter that is highlighted.

To view a particular parameter value in a graph, press the Down arrow key then press ENTER and that parameter's graph will display at the bottom of the screen.



Highlight Live Data and press ENTER



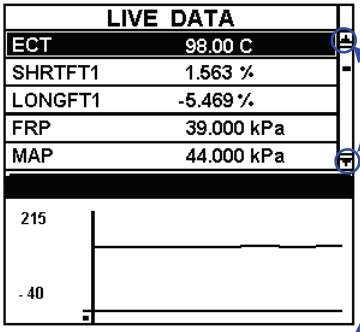
Press Up or Down arrow keys to select parameters.
Scroll bar moves accordingly.

Arrows at top and bottom of scroll bar indicate more available parameters.

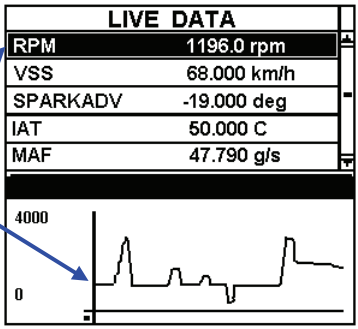
Parameter value displayed in a graph.

Each parameter has a predetermined value range.

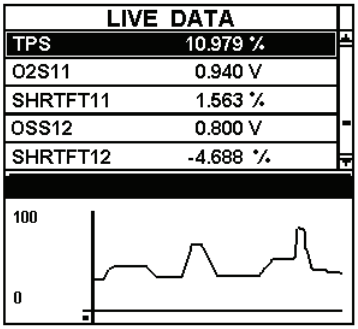
Every time that you press the Down arrow key the parameter underneath will be highlighted and its value displayed in a graph.



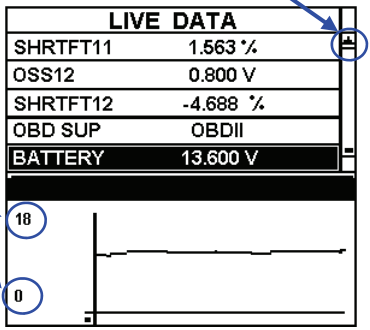
Arrows indicate more parameters available at top or bottom of the list.



The new parameter selected displays it value and the graph changes as well, in real time.



Here we see an arrow only at the top, indicating that there are no more parameters available at the bottom.



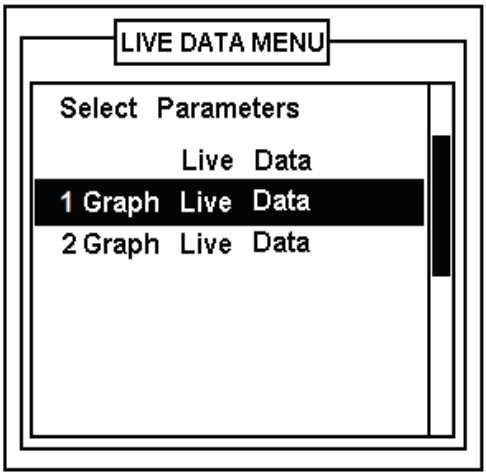
The range value changes with every parameter, the value adjusts to the most common for that parameter under normal conditions.

NOTE: The screens shown in here are for illustration only, the CJ4 can retrieve up to 104 parameters, depending on the vehicle.

1 Graph Live data

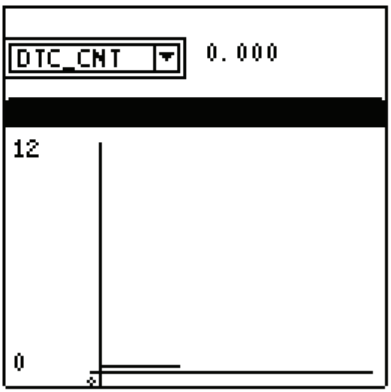
The third choice in the Live Data menu, displays a single graph of a selected parameter, from the ones available on the vehicle.

To start this function, select “1 Graph Live Data” by pressing the Down arrow key to highlight it, then press “ENTER” key.



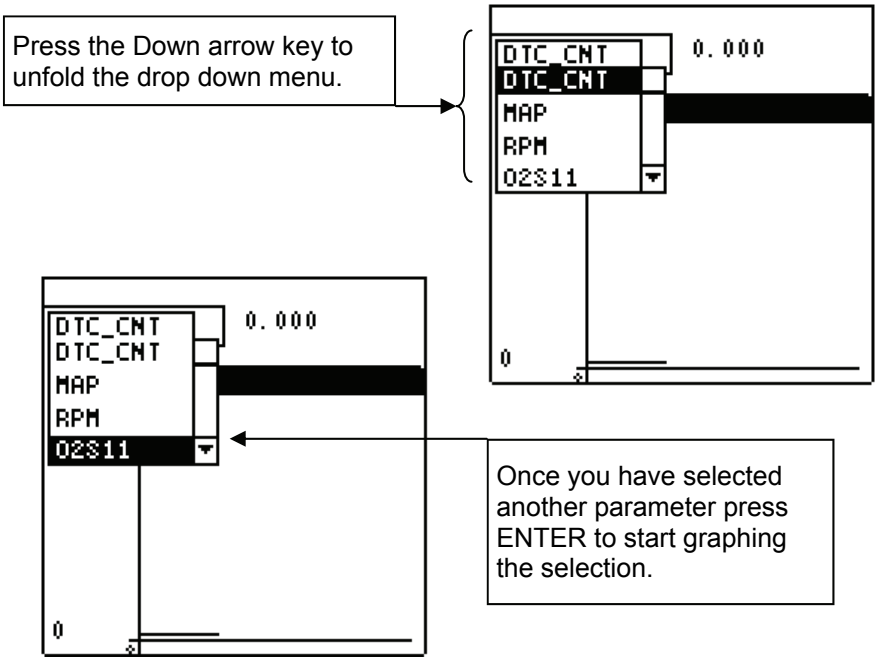
A single graph screen is displayed, in it on the upper left corner, you will see a drop down menu window in which you can select a parameter to view.

When you enter this screen, a graph of the parameter in the drop down window will start appearing.

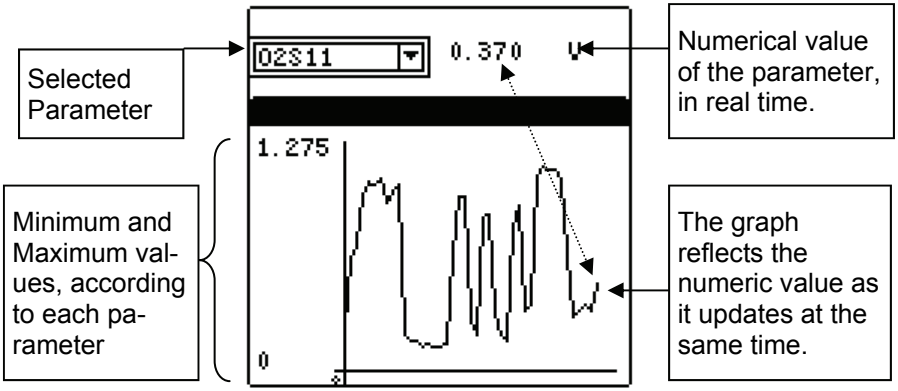


To change the parameter, press the Down arrow key on the CJ4 to reveal the available parameters.

All available parameters will be shown in the drop down window. Using the Up and Down keys, search for the parameter that you want to be graphed by the CJ4.



The CJ4 will start displaying the new parameter selected.


Selected Parameter
02S11
0.370
V
Numerical value of the parameter, in real time.
1.275
Minimum and Maximum values, according to each parameter
0
The graph reflects the numeric value as it updates at the same time.

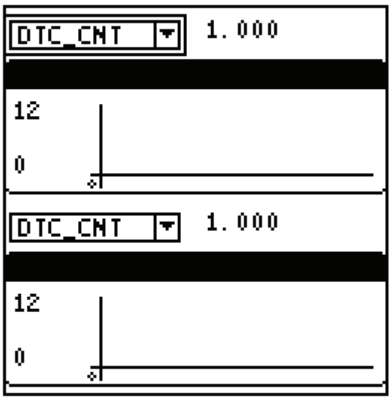
Repeat the previous steps to select another parameter to be graphed.

2 Graph Live Data.

This option allows the technician the ability to view 2 different parameter graphs simultaneously on the screen in real time. This function is very useful, especially when verifying two different signals that are linked to a system.

To access this function, from the Live Data menu, highlight “2 Graph Live Data” and press the ENTER key on the CJ4 pad.

The following screen is displayed in the CJ4.

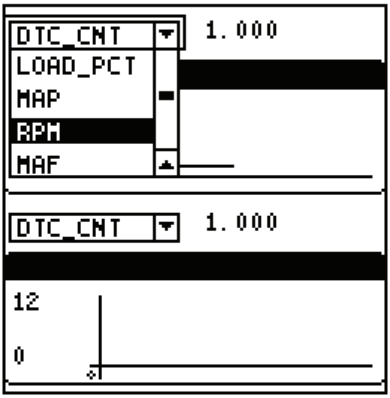


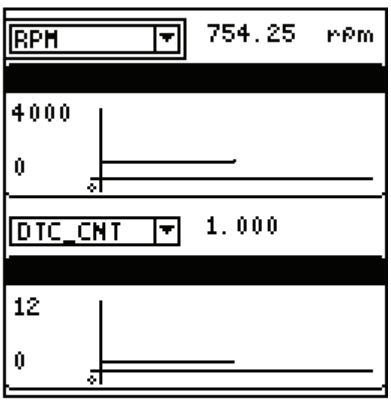
An example of this functions is this; we need to verify operation of a TPS at the same time with the engine RPM.

We need to select each parameter in the upper and lower graph sections of the screen.

First press the Right arrow key, the drop down menu of the upper graph is unfolded to show the available parameters.

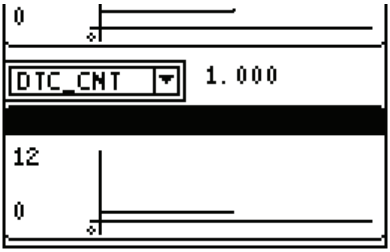
Next, with the UP and Down arrow key scroll to the desired parameter, when it is highlighted, press the ENTER key. In this case it will be RPM.





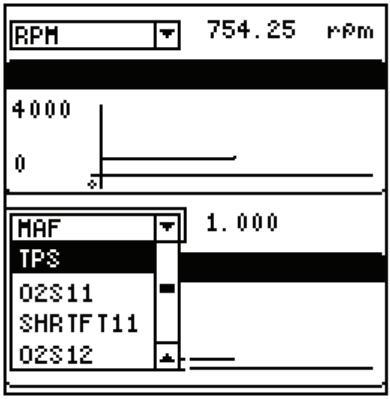
The RPM signal will generate its numeric value and graph will be displayed automatically in the upper section of the screen.

To select the second parameter, press the Right arrow key, then the lower drop down menu window gets “framed”, then press the Down arrow key to unfold the window’s drop down and the available parameters are shown.

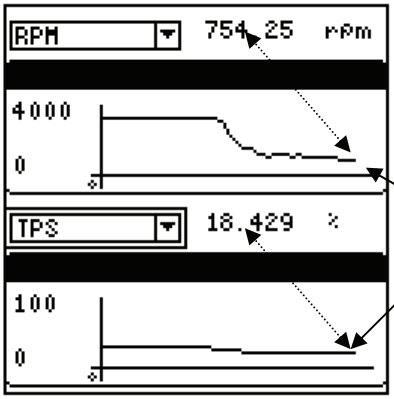


Repeat the same steps like for the selection of the first parameter, remember it is done by pressing the Up and Down arrow keys then, the ENTER key.

1– Use Up and Down arrow keys to select parameter.
In our example, the TPS.
2– Press the ENTER key.



When this operation is completed, the following screen will be displayed:



The parameter values and graphs get updated at the same time.
The graph's leading edge (live data) is all the way to the right.

If you select a parameter by error or you want to see another, press the Right arrow key to switch between the upper and lower drop down windows, then press the Down key to unfold the menu, select the parameter and press ENTER key.

The graphs will continue to get generated as the signal is retrieved by the CJ4, this is done indefinitely.

To exit this function press the ESC key to return to the Live Data menu.

-O2 Tests.

The Oxygen sensors provide information to the computer as to the amount of Oxygen in the exhaust gases exiting out the tail pipe. This information helps the engine computer in determining fuel injection delivery amount to try and reach the ideal Stoichiometric ratio. This ratio is the mixture of air and fuel equivalent to 14.7:1. 14.7 parts of air to 1 of fuel, this “ideal” mixture burns efficiently without contamination. This proportion is also known as Lambda.

There are many factors that prevent to always reach this mixture on gasoline internal combustion engines, some are; engine temperature, intake air temperature, altitude were the vehicle is operated, etc. The result is, generating contaminating levels that can be high.

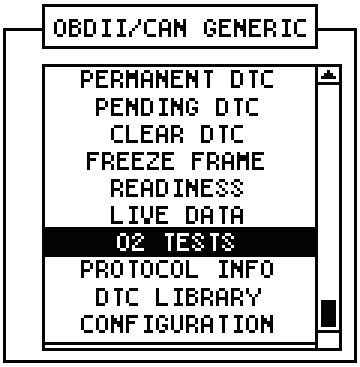
Because of this, ecological deteriorations occur, governments in many countries promote laws that require automobile manufacturers to implement systems that reduce this type of emissions. Another factor that prompted de development of emission controls, was the fuel crisis of the 1970s, that mainly affected the USA, generating since then, strict regulations for emissions outstanding, the state of California.

Encompassed in the progress of the On Board Diagnostics (OBD I and OBD II), more tests have been added to this systems, that allow monitoring the function of the Oxygen sensors.

The CJ4 includes the Oxygen sensors test, which allows verification of response time, operating voltage range for each sensor in its respective bank.

It is important to clarify that the availability of sensors, how many and what kind of testing, is in accordance to manufacturer specifications, considering also the variations that each make, year and vehicle model.

From the OBDII/CAN Generic main screen, use the arrow keys to highlight the “O2 Tests” title and press ENTER key.



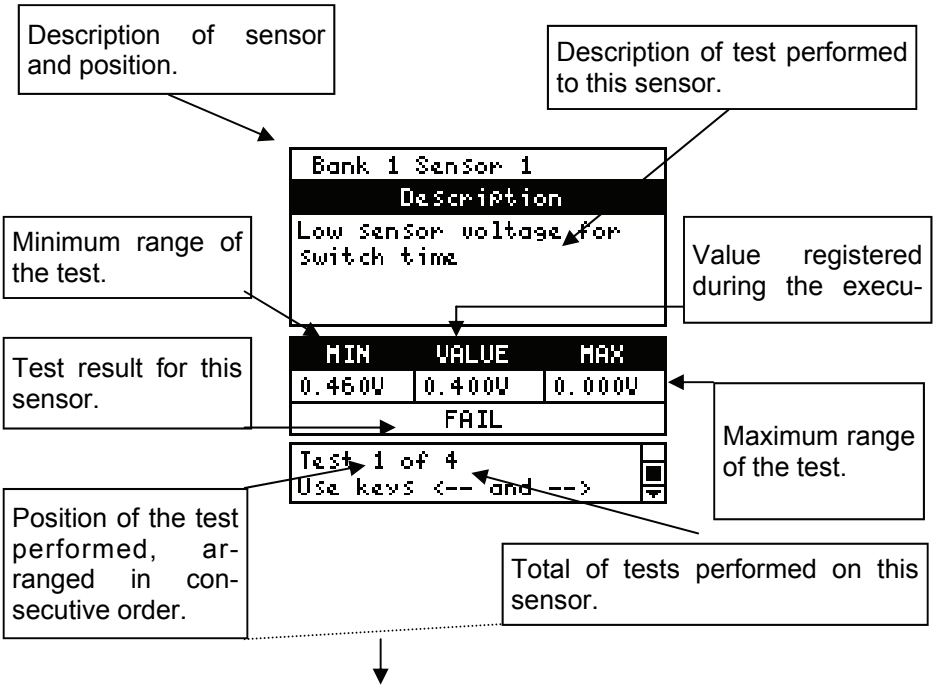
On this screen press ENTER, the CJ4 will look in the vehicle computer for available sensors.

A new screen “Oxygen Banks” will show the available O2 sensors and their position.

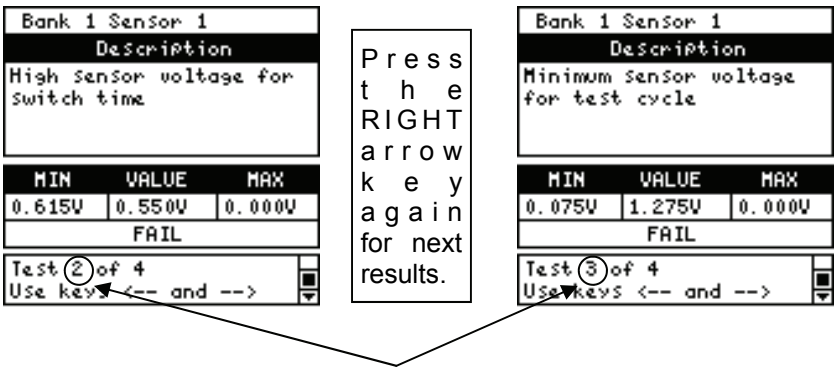
Press ENTER key to start the test on this O2 sensor, or select another by pressing the Up or Down keys then press ENTER.

NOTE: In order to adequately perform this tests, the engine needs to be idling and coolant temperature at normal range. Otherwise the tests will be erroneous and display wrong data.

For this example we are going to test “Bank 1 Sensor 1”, the following screen will be displayed with the results of the test.



To see the rest of the test results, just press the Right arrow key, the new screen will show the results for the next test in the sequence of tests performed to this sensor.

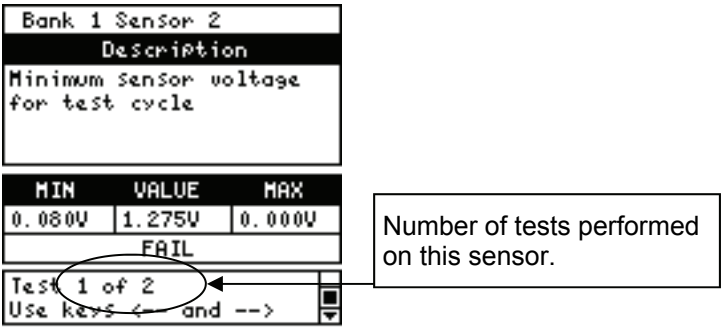


Notice that the test result sequence number changes on each new screen.

Once you have reviewed all the results for Bank 1 Sensor 1, press the ESC key to return to the “Oxygen Banks” screen in which you can select another sensor for testing, Bank 1 Sensor 2 as in our example.

Press the ENTER key to initiate the tests by the CJ4.

Again, the test result screen will display Oxygen sensor data, now for Sensor 2 on Bank 1. If more then one test was performed on this sensor, all results are available by pressing the Right key.

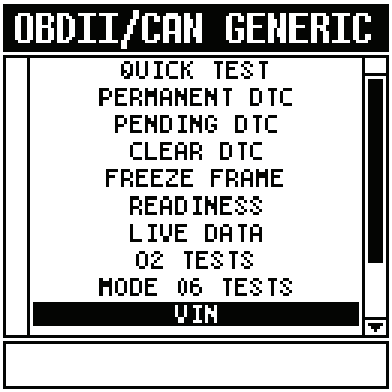


Remember that the CJ4 only tests those sensors that are available for test in the vehicle. The CJ4 may detect the sensors but it wont be allowed to perform the series of tests, this function is vehicle dependent.

-VIN

The VIN or Vehicle Identification Number is a series of 17 digits, usually numbers and letters, assigned at the factory and is unique to each vehicle. This number contains information such as make, year and model, engine size, and factory serial number for that particular vehicle.

This feature is available on those vehicles that, from factory according to make, year and model, is recorded into the ECU.



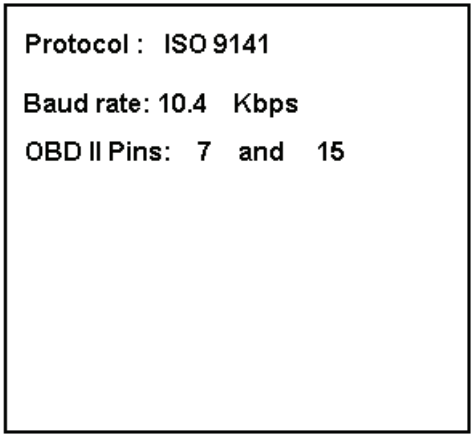
With the UP and DOWN arrow keys highlight “VIN” and press ENTER

If this information is available from this vehicle, this screen will appear.

If the vehicle does not support this feature this screen will be displayed.

-Protocol info.

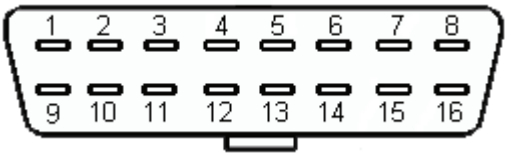
This function will display the characteristics of the communication protocol that the vehicle being tested has.



- Protocol:
  Is the communication standard for that vehicle.

- Baud Rate:
  Is the signal communication speed between the vehicle's computer and the CJ4.
  It is measured in Kbps = One Thousand Bauds per second.

- OBD II Pins:
  The numbers displayed indicate the pins that are used by the DLC connector to transmit data between the vehicle's computer and the CJ4 Scantool.



-DTC Library.

One of the characteristics of the OBD II system is that codes and their descriptions tend to be standardized. Trouble Code or Fault Code are the common names used to describe that the vehicle's computer has detected a problem. In previous OBD systems, codes would be 1, 2 or 3 digits, and were represented by numbers only.

The J2012 standard, establishes definitions for trouble codes that affect systems related to emissions. The codes used by OBD II systems are five digits long, start with a letter, and followed by 4 numbers. Since they start with a letter, the only way to retrieve and understand them is with a scanner like the CJ4 Scantool. The range of codes was designed to allow for expansion in the future.

Universal Designation.

The first number next to the letter indicates if the code is common for all auto makers (P0xxx). This code is used by most manufacturers, the number and description is similar. This codes are widely known as Generic.

The letter identifies the system which registered a problem.

P	Engine and Transmission
B	Body
C	Chassis
U	Vehicle Systems Communication Network

Specific Designation.

Each auto manufacturer has particular conditions in the design of their systems. This codes are not used by all manufactures, due to their basic system of operation, diagnostics procedures or variations in their implementation. This codes are known as Specific (P1xxx).

Specific codes P1xxx are designated with their own description and assigned for a specific fault or system. Even though codes are assigned by a manufacturer for the same make, they have variations in their use on different models and years.

DTC Numbering system.

The second digit (from left to right) in the code number, indicates a system or subgroup were the fault was detected. This number is consistent in generic P0xxx and specific P1xxx codes. The standard is like this:

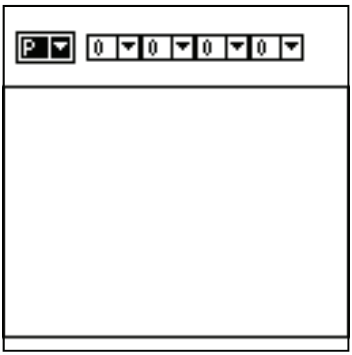
P0100	Air intake and fuel systems.
P0200	Fuel system, related to fuel injectors only.
P0300	Ignition (Misfire).
P0400	Emission Controls.
P0500	Idle Speed Control or Vehicle Speed Sensors.
P0600	Actuator Components (Relays, Solenoids, etc.)
P0700	Transmission

This function can be used without having to retrieve codes from the vehicle, if you know or want to find out any generic code description.

The CJ4 has an integrated library, which you can consult for generic code descriptions generated by most OBD II vehicles.

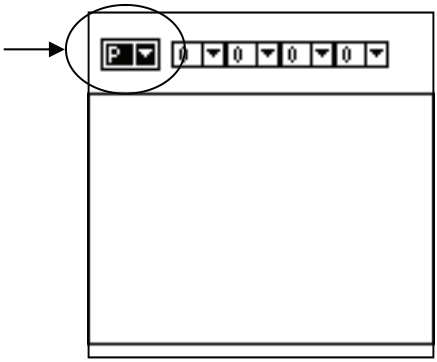
To access this feature, from the OBDII/CAN Generic menu, press the Down arrow key until the DTC LIBRARY title is highlighted then press ENTER.

This screen will be displayed in the CJ4.



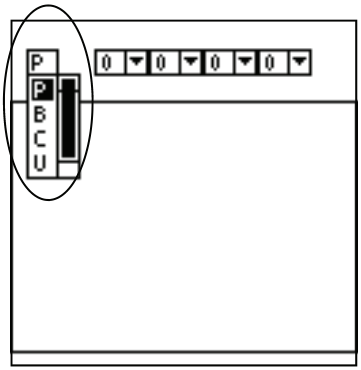
For example, we are going to search for description of code P0837.

When this screen is accessed, the first window is “framed”, in there we are going to select the letter for the system that the code is from.



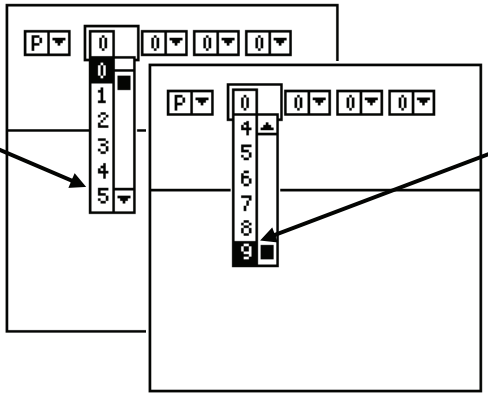
Press the Down arrow key, the drop down menu will show the predetermined choices, P, B, C, U.

Using the Down arrow key select the letter “P” for the code that we are looking for, then press ENTER. The menu will close and the letter will show in the window.



Next, press the Right arrow key to move to the second window. This window will be “framed” and ready to be accessed. Press the Down arrow key for the drop down menu to appear.

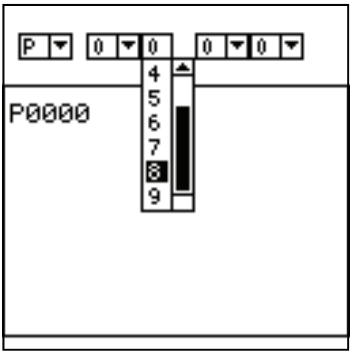
The numbers 0 to 5 will appear first, if the number that you are looking for is here, press the Down key to highlight it.



Keep pressing Down key to go to numbers 6 to 9. Stop at the desired number. In our example is 0, so we need to press the UP key to reach the number 0, once there, press ENTER.

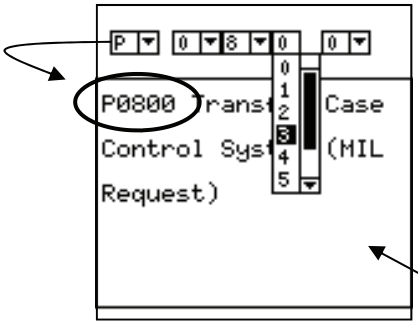
NOTE: *The library in the CJ4 is for generic descriptions only, so the second digit should be 0.*

Now it's time to select the third digit (8) in our code description search.
Press the Right arrow key to "frame" the next window. Once there, press the Down key and again, the numbers will appear in the drop down menu.



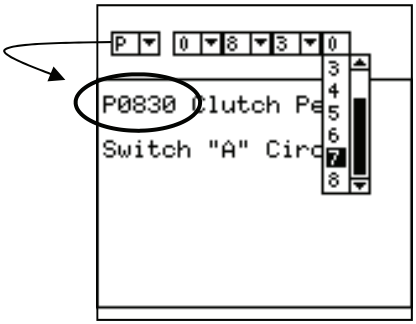
Repeat the same process as we did for the second digit to select the number 8 for our code. Repeat the steps for the fourth and fifth digits.

Select number 3



Notice that description for the code that matches the numbers in the boxes is displayed, continue to the next box to make selection of next number.

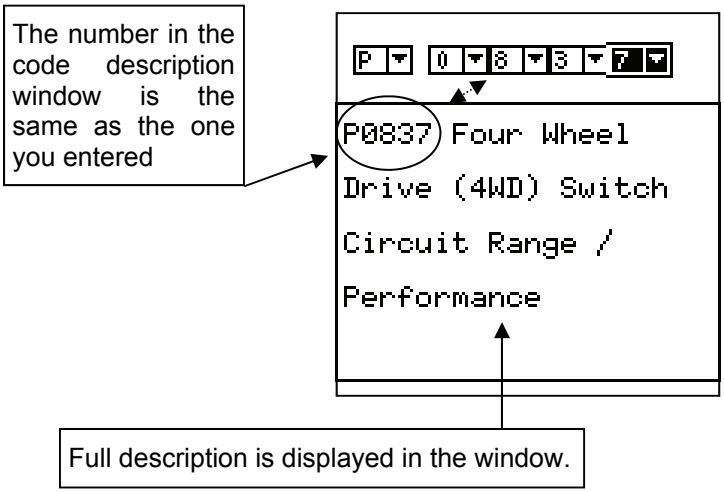
Select number 7



RECAP:
1– “Frame” a window.
2– Press Down arrow key.
3– Press Down or UP keys to highlight a number.
4– Press ENTER to select number.
5– Press Right arrow key to “frame” next window, and repeat steps 2-5 for next digit.

As mentioned before, every time a digit is selected, description for the digits in the boxes is displayed.

We have made our last digit selection and automatically the description to the P0837 code is displayed as seen in the screenshot below.


The number in the code description window is the same as the one you entered
P 0 8 3 7
P0837 Four Wheel
Drive (4WD) Switch
Circuit Range /
Performance
Full description is displayed in the window.

If you entered a code number that is manufacturer specific, there may be no description available, the same is true if you entered a bogus number.

In the future, memory cartridges with specific vehicles applications will be available and code descriptions for the same will be accessible in the same manner.

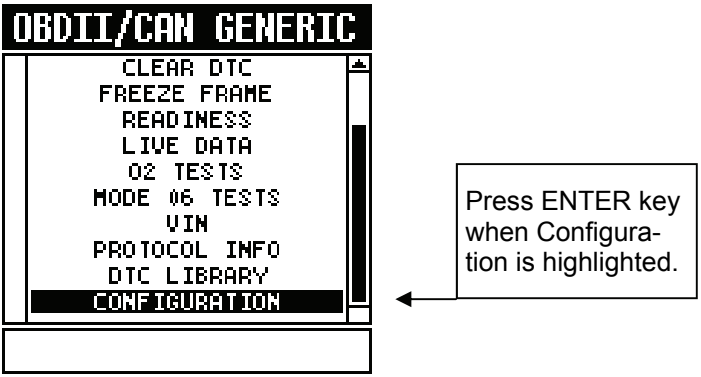
-Configuration.

The CJ4 Scantool has the capacity to display information in English or Spanish. Also, you can change the units of measure between English and Metric. When the CJ4 is switched to Spanish, not only the functions are displayed in Spanish but also the code descriptions. Refer to page 7 "CJ4 Main Menu" and the "Language" submenu for instructions on how make changes.

This configuration option applies to the OBDII/CAN Generic submenu and is for the parameters units of measure.

To change units of measure, follow this procedure.

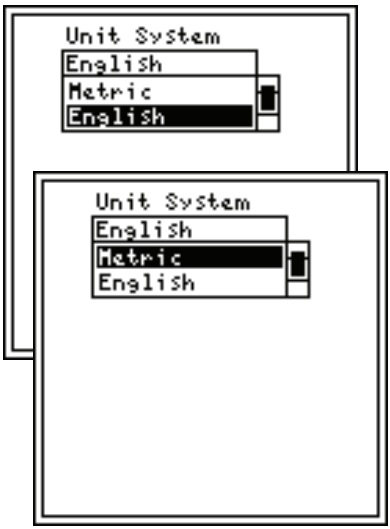
Use the Down arrow key to highlight the "Configuration" title then press ENTER in the keypad of the CJ4.



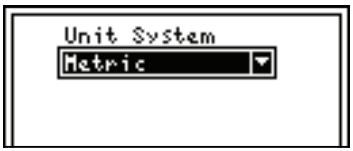
The next screen will appear, then press ENTER.

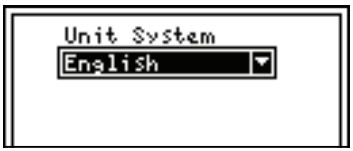
The screen displays the Metric and English units of measure options.

With the UP and DOWN arrow keys make your selection and press ENTER.



After your selection and having pressed ENTER, the screen will display the units of measure that will be represented when viewing parameters.





It is recommended to set the CJ4 accordingly to the type of vehicle being worked on. If you are working on a vehicle made in or for the USA the best setting is English System units of measure, since most specifications in service manuals are in SAE.

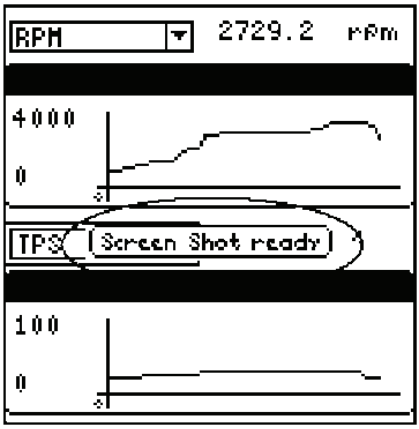
For Asiatic and European vehicles, the recommendation is Metric system, since this is the standard for DIN and JIS.

Screenshots reminder.

The CJ4 has the ability to take screen shots of the information being displayed on the screen, in practically all of the functions.

Screen shots are very easy to take;

- When you are working in either the OBDII GENERIC or Battery Tester functions, just press the Down key for 2 seconds, on any diagnostic screen then, a window will appear with the message: "Screen Shot ready".



- To take a screen shot when in the Labscope option, you need to press the LEFT and RIGHT arrows key at the same time, the "Screen Shot ready" message window will appear on the screen.

The screen shots will be stored in the memory of the CJ4 Scantool in a progressive manner, the CJ4 will assign a number that is consecutive, without regards to which function (OBDII Generic, Battery Tester or Labscope) they were taken from.

To manage the images stored in the CJ4 consult the section "Screen shots" in this manual.

INTERFACE MODE (a)

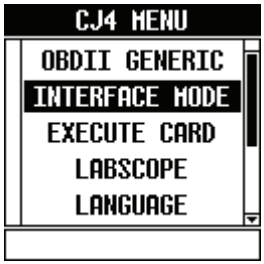
With this option, the CJ4 can communicate via a serial cable, USB or wireless Bluetooth with PC/Laptops and PDAs.

This communication option allows the CJ4 with the ability to act as a data communication interface between a vehicle and a PC, and to take advantage of the diagnostic programs developed by Injectronic, which permit preparing a report and option to print with the shop and customer information.

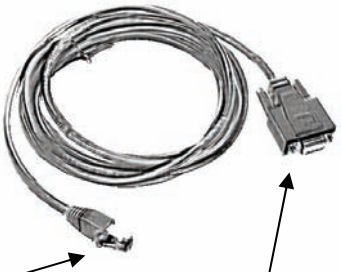
Another function of this type of connection is for updating the CJ4, and to transfer data like screenshots to a PC.

SERIAL:

To set the CJ4 to the serial Interface Mode, press the Up or Down arrow keys in the key pad to highlight the “Interface Mode” option in the Main Menu of the CJ4.



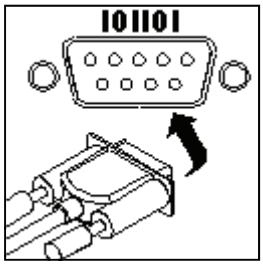
Connect the serial cable to the CJ4 and COM port in PC.



This end to the RJ45 port in the CJ4. (see figure 1-G on page 3)

This end to a COM port in a Laptop or PC.

Now press ENTER and this image appears in the screen



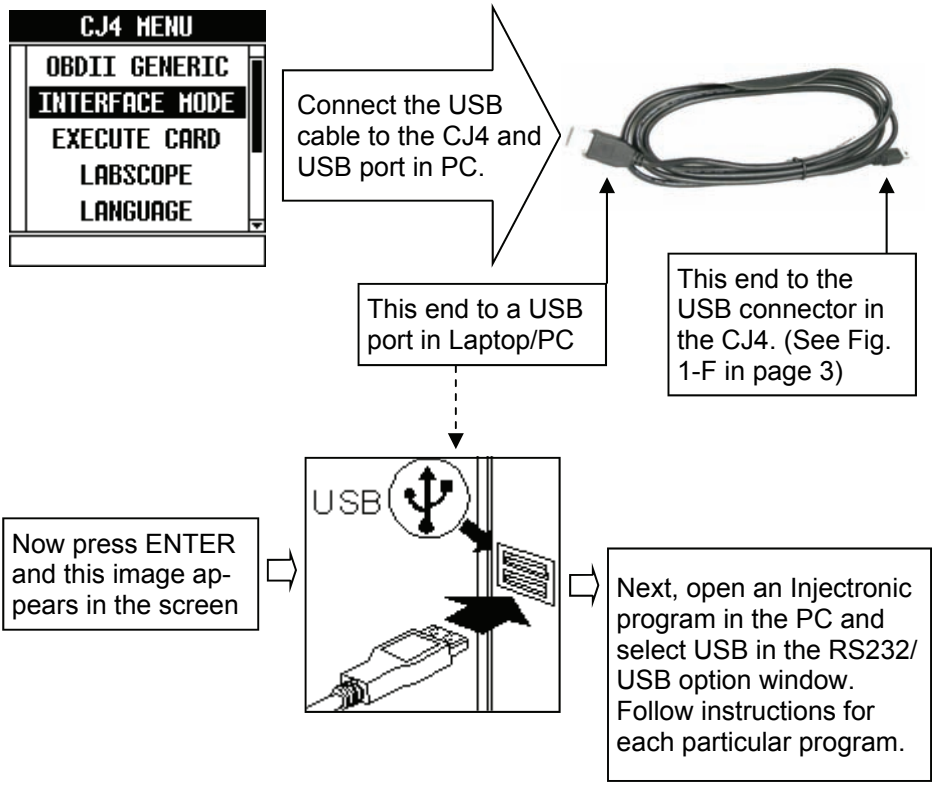
Next, open an Injectronic program in the PC and select the COM port assigned to the CJ4 to establish the connection. Follow instructions for each particular program.

INTERFACE MODE (b)

Additionally to the serial communication port, the CJ4Scantool can be connected to a PC or Laptop with the USB cable (supplied), this feature allows the CJ4 to be used with any newer computer that does not have a COM port.

USB:

Follow these steps to set communication with the USB cable.


CJ4 MENU
OBDII GENERIC
INTERFACE MODE
EXECUTE CARD
LABSCOPE
LANGUAGE
Connect the USB cable to the CJ4 and USB port in PC.
This end to a USB port in Laptop/PC
This end to the USB connector in the CJ4. (See Fig. 1-F in page 3)
USB
Now press ENTER and this image appears in the screen
Next, open an Injectronic program in the PC and select USB in the RS232/ USB option window. Follow instructions for each particular program.

At this time you are ready to do either of this:

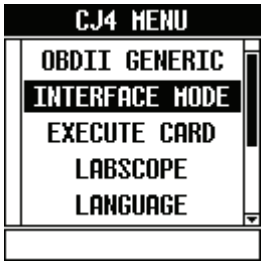
- Use the CJ4 as an interface between a vehicle and a PC,
- Transfer screen shots from the CJ4 to a PC,

INTERFACE MODE (c)

To make the CJ4 even more versatile, it can transmit data to a PC/ Laptop and PDAs via wireless Bluetooth © communication. An adaptor is an available option accessory from Injectronic that permits this function.

Wireless BLUETOOTH:

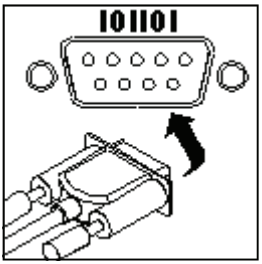
The wireless Bluetooth adaptor comes complete with a connector cable and the Bluetooth transmitter. Follow this instruction for this set-up.



Connect the adapter cable to the CJ4.

This end to the RJ45 port in the CJ4. (See Fig. 1-G in page 3)

Now press ENTER and this image appears in the screen



Next, open an Injectronic program in the PC and select the virtual COM port for this connection or the one assigned to the adapter to establish the connection.
Follow instructions for each particular program.

To use this feature, your PC/Laptop needs to be Bluetooth © enabled, an optional adapter is available from Injectronic that allows this type of communication.
(Not to be confused with WiFi)

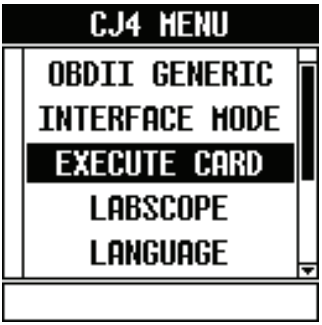
EXECUTE CARD

This option allows the CJ4 to execute functions included in the external modules (cartridges) that are inserted in the back side of the CJ4. See figure 1-A in this manual.

Insert the cartridge into the CJ4, making sure that it is securely in place. Then, connect the OBDII connector to the DLC in the vehicle following the procedure described in the “Connecting to the Vehicle” section of this manual.

Once the CJ4 is powered on, select the “Execute Card” title on the CJ4 Menu screen, using the Up and Down key to achieve this.

With the Execute Card title highlighted, press the ENTER key.



Depending on the application on the cartridge, the screen that is displayed next will be different, follow instructions included with the cartridge.

If no cartridge is inserted in the memory slot of the CJ4, this message will appear on the screen.

Just press the ENTER key to return to the Main Menu of the CJ4.

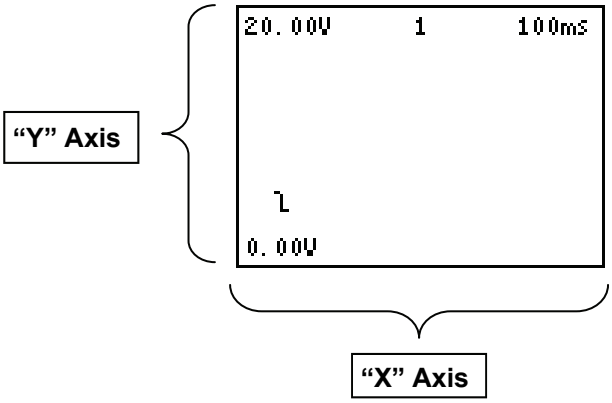
LABSCOPE

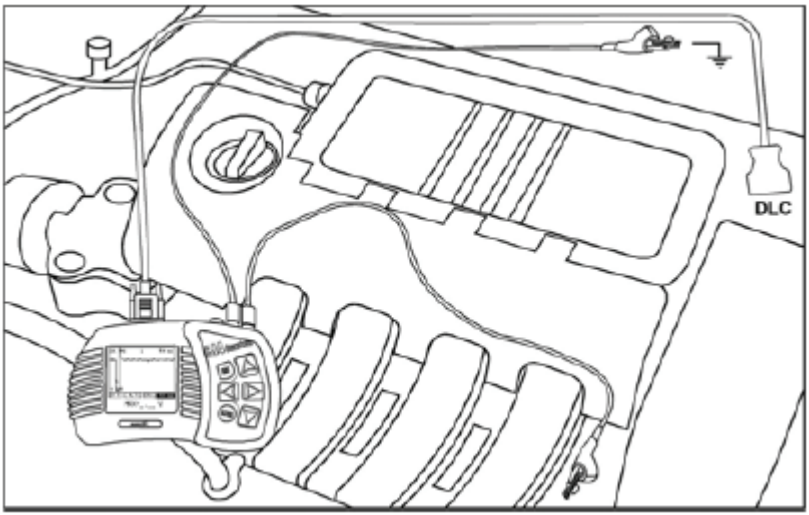
"Seeing" the signals that sensors, actuators and communication between Control Units has become a necessity in recent model vehicles. This is due to the increasing use more systems controlled by computers and those computers take in signals from sensors and put out signals to actuators.

The CJ4 with it's built-in Oscilloscope allows viewing those signals as they go in and out of control modules. Decisions on the control modules are made accordingly and affect the overall operation of the engine or system that a particular signal, being input or output, is faulty or non-existent.

A quick explanation of an oscilloscope is this.
The signal picked up by the test leads is represented by lines in the screen and this lines are a direct representation of the voltage that passes through wires or goes in/out of sensors and actuators.

This voltage appears in a scale with two axis. Axis "Y" is vertical (up-down) and displays the voltage available, axis "X" is horizontal (left-right) and displays the length of time that voltage is present.





SPECIFICATIONS

- DC, 20 Khz
- Max of 200 samples per second
- 1 Mega ohm, 25 pF input impedance
- 0 V to 20 V
- Time scale from 312.5uS to 10 minutes
- 25mA power consumption at max sample rate
  20uA I low consumption mode

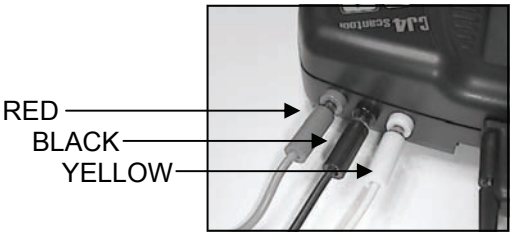
NOTE:* *This Oscilloscope is for Automotive use Exclusively.

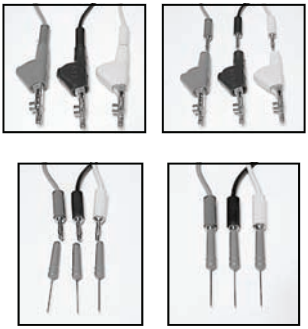
CONNECTING THE TEST LEADS

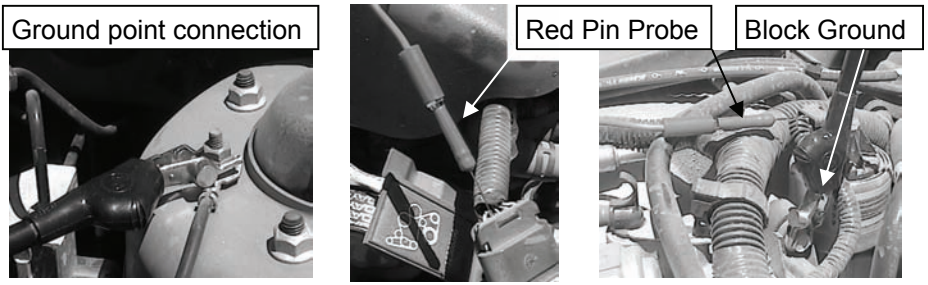
The CJ4's Oscilloscope uses three leads to perform test;

- BLACK, is a ground connection (negative), connect it first.
- RED, is for channel #1 (positive)
- YELLOW, is for channel #2 (positive)

- The OBD II connector has to be plugged in to power the Labscope.
- Both channels use the same connection to ground, the BLACK lead, make sure you have a good clean contact (no paint or rust), best when connected to battery negative post, engine block or ground point
- The CJ4 has female color coded connectors at the top to correspond to the colors of the test leads.
- 3 "acupuncture" pin probes are included, they are used to pierce into a wire or to "back-probe" on a connector. ***Caution should be taken when handling the pin probes to prevent personal injury.***
- When using the Voltmeter function or the Oscilloscope in 1 channel, use the BLACK and RED test leads only.

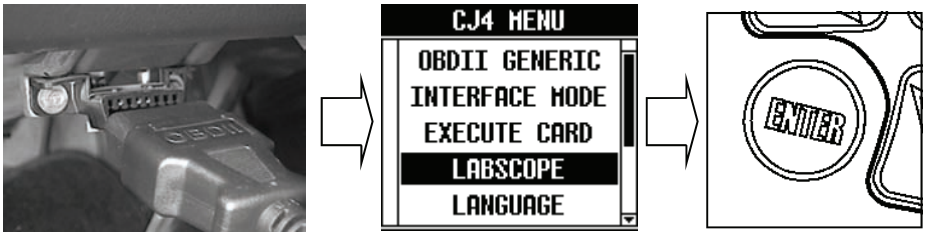






Oscilloscope Operation

Plug the CJ4's OBD II cable onto the ALDL connector in the vehicle, highlight LABSCOPE in the CJ4 Main menu and press ENTER.



Oscilloscope Menu options

Single Channel will display only one graph, of either, channel 1 or 2.
Use this setting to measure Voltage from injector circuits, inductive sensors, Hall effect sensors, O2 sensors and others.

Double Channel allows viewing two graphs simultaneously.
This allows to get readings of input and output of a sensor, an actuator and a sensor, battery voltage and a circuit voltage, etc.

Oscilloscope Menu options continued

The **Voltmeter** function is for simple voltage readings. It is displayed in digital format only, no graphs.

Frequency Graph refers to how many times a signal is present. Sensors an actuators work in this mode, some send and receive a “square” or “wave” signal. (i.e. ABS sensors, crankshaft/cam sensors, VSS sensor)

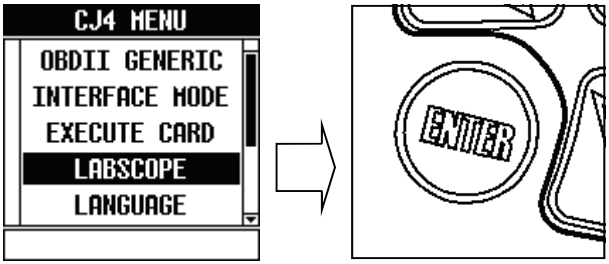
Here you can change the **Language** of all functions in the Oscilloscope feature.

Reminder:

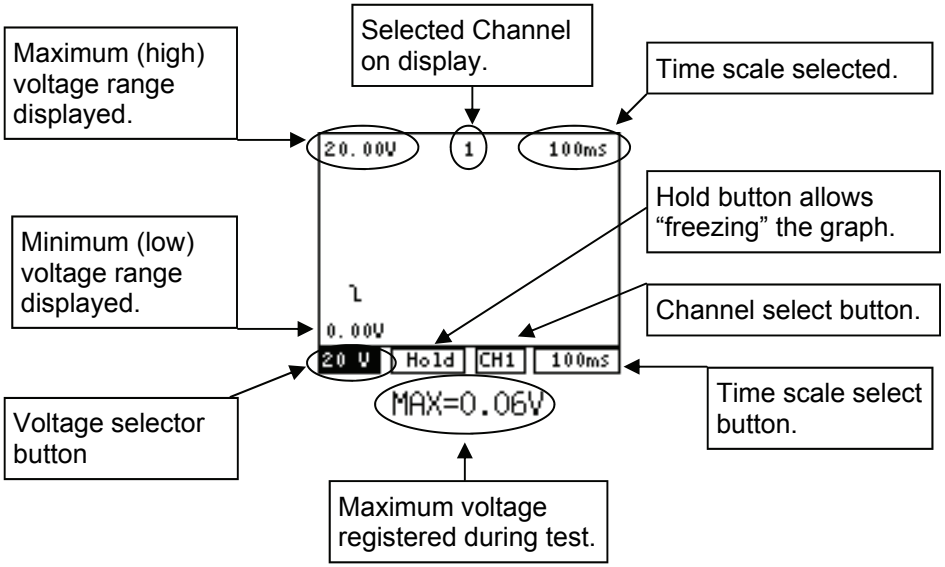
The screen capture feature is available in all the Labscope functions. Please refer to the Screenshot section for instructions.

Access and Display features

Press ENTER when Single Channel is highlighted in the CJ4 main menu.



The following screen is displayed:



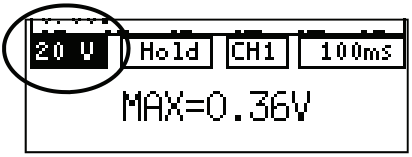
In order to get an accurate reading, it is necessary to adjust the settings in the Labscope for the signal being tested.

In the next pages we are going to describe how to adjust (calibrate) the Labscope, as well as the different functions available from the Labscope.

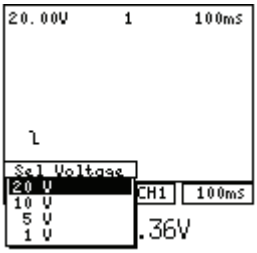
SINGLE CHANNEL

Voltage adjustment.

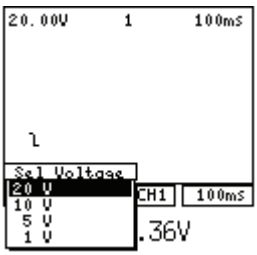
This adjustment is done by modifying the value on the button at the bottom left corner in the CJ4 screen. This button is selected (highlighted) when you first access the Single Channel function.

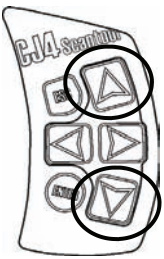


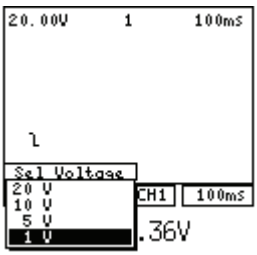
Press ENTER to display the drop-down menu.



Press de UP or DOWN arrow keys to select the appropriate voltage for the test about to be performed. The available voltage ranges are: 1, 5, 10, and 20 volts.







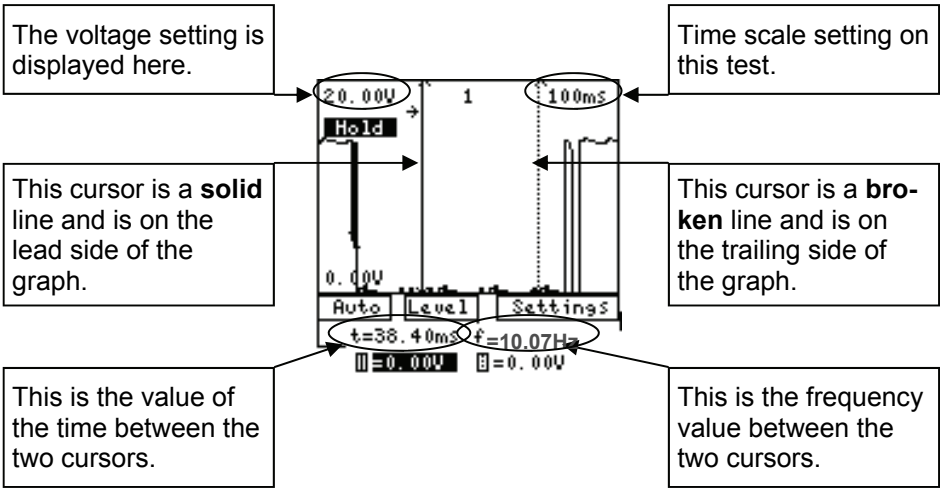
Refer to a repair manual for the voltage value of the item tested, for example: an oxygen sensor generates a signal of 1 volt maximum, inductive type sensors 12 volts, etc. In order to get the correct voltage displayed during the test, the voltage range needs to be adjusted.

Hold

The second button on the Single Channel screen is the HOLD button. This feature “freezes” the display during a test, to analyze the wave form.

The Hold screen counts with two cursors, that can be moved to compare or view a value at any point in the wave form.

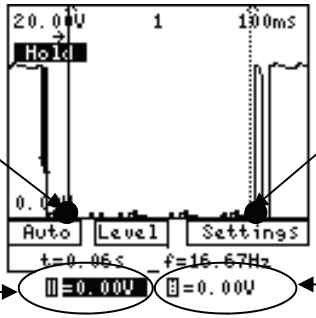
As an example, in the following screens we are going to explain each item that is displayed.


The voltage setting is displayed here.
Time scale setting on this test.
This cursor is a **solid** line and is on the lead side of the graph.
This cursor is a **broken** line and is on the trailing side of the graph.
This is the value of the time between the two cursors.
This is the frequency value between the two cursors.
20.00V
1
100ms
Hold
0.00V
Auto
Level
Settings
t=38.40ms
f=10.07Hz
1=0.00V
2=0.00V

When you press the ENTER key and the Hold button is highlighted, the screen that is being displayed “freezes” and the following screen appears, the cursors are positioned in a predetermined position in the graph, you can mode them to any position within the graph.

This is the point were the **solid** cursor crosses the voltage line on the leading side of the graph.

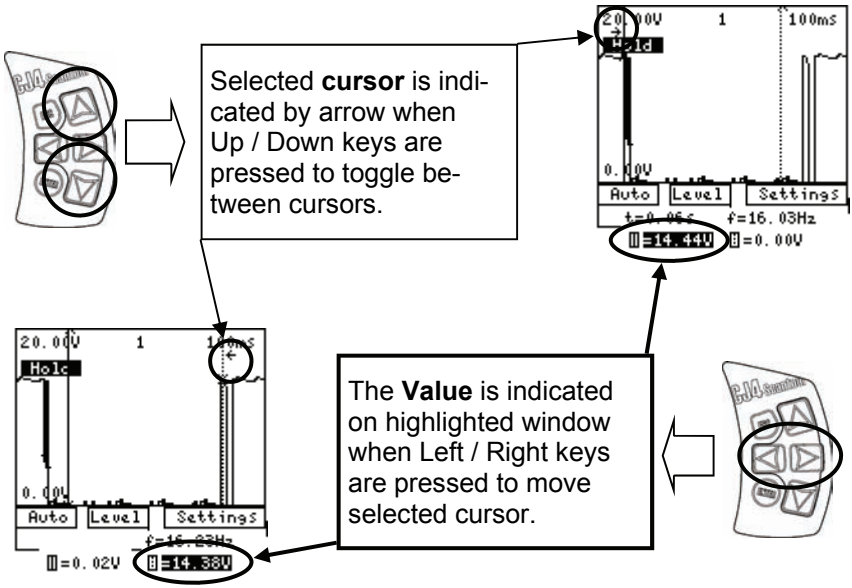
This is the point were the **broken** cursor crosses the voltage line on the trailing side of the graph.



This is the value of where the **solid** cursor is in the graph.

This is the value of where the **broken** cursor is in the graph.

To move the cursors, first, press either UP or DOWN arrow keys and the **value** for the corresponding cursor will toggle accordingly (left or right cursor) then, second, press either LEFT or RIGHT arrow keys to move the selected cursor to the left or right of the graph. While doing this, the value of the cursor will change as it is moved.

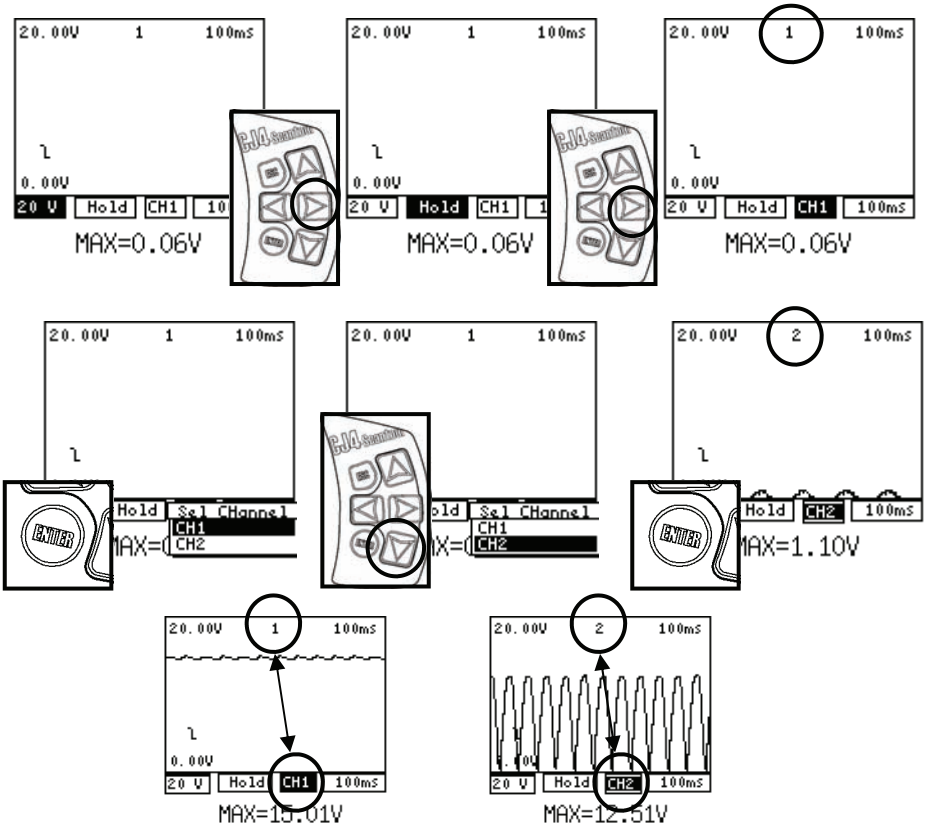


Channel

This option allows the CJ4 to display your choice of channel, channel 1 is automatically selected when you access this function.

To change channel, first, using the RIGHT arrow key scroll to the CH1 button, then press ENTER, with the DOWN arrow key highlight CH2 and press ENTER. Now the number 2 appears at the top of the screen in the middle, verifying that you are in channel 2.

Remember to have the Yellow test lead connected to a test source in order to get a signal when in channel 2.



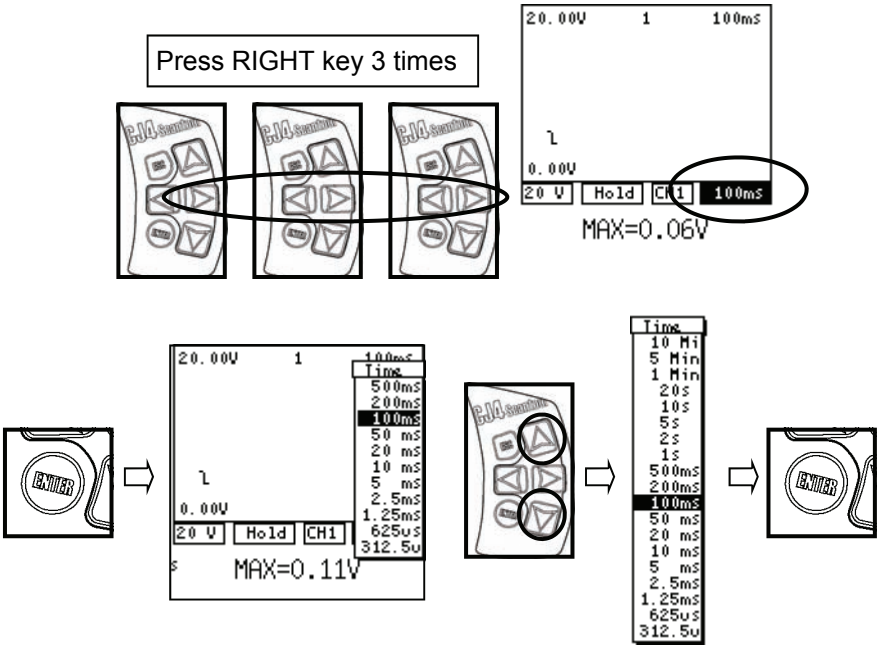
Repeat the same steps to return / change channels.

Time Scale

The time scale in use is displayed in the upper right corner of the screen. This value is represented in the X axis (horizontal) of the graph.

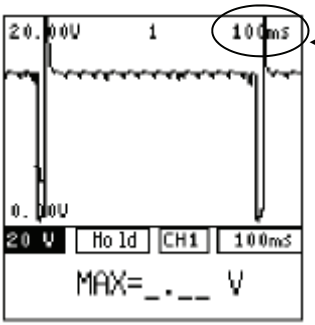
To modify the time scale, with the RIGHT arrow key scroll to the time scale button and press ENTER. A series of time options is displayed and they range from 312.5 microseconds to 10 minutes.

With the UP and DOWN arrow keys, scroll to the desired time and press ENTER key, the screen will show the scale in use now and the graph will be adjusted accordingly. If no graph is visible, repeat the steps to select a faster time scale until the graph is visible and you are able to make a diagnosis with the information being displayed.



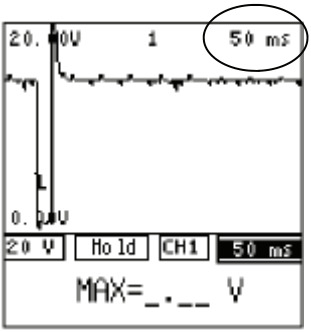
Min = Minutes
s = Seconds
ms = Milliseconds or Thousandths of a second
us = Microseconds or Millionths of a second

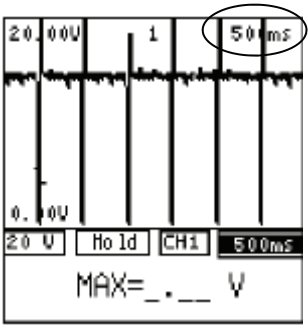
This adjustment is dependent on how fast the signal is generated. It is possible to adjust the time scale to see different perspectives of the electrical signal, for example;



This is graph of a fuel injector in a V6 engine.
The time scale is adjusted to 100 ms.

The same injector with the time scale adjusted at 50 ms.
In here we are looking at half of the time then the previous graph.
In other words, we are zooming-in to just about one cycle of the signal.





Still with the same injector and the time scale adjusted to 500 ms (half of a second), the graph shows more cycles (pulses).
Notice the details are not as visible as with lower time scale settings.

Trigger

The trigger is used to stabilize and optimize the graph being displayed There are three parts to configure the trigger.

Two modes:

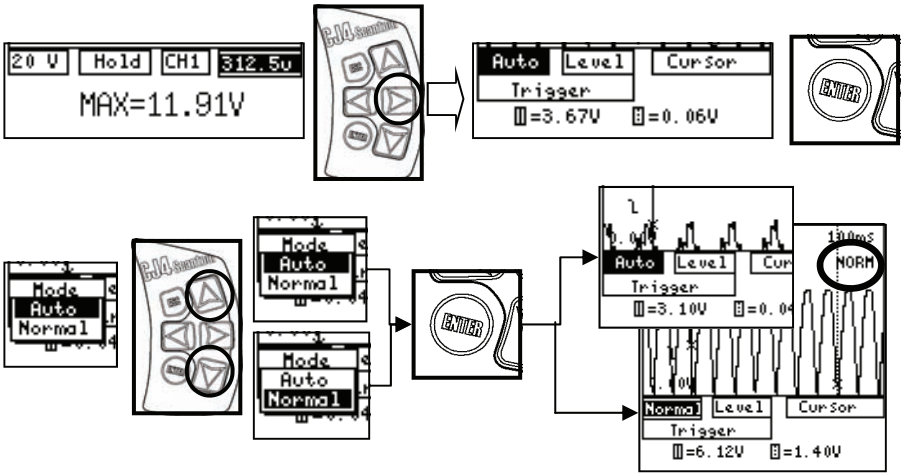
1. Normal: The graph is refreshed if the signal meets the requirements set by other trigger configurations. Use this mode when a user identified signal is being tested.

2. Automatic: The screen is refreshed even if the requirements of other configuration adjustments are not met. This mode helps to display graphs like analog voltage.

And voltage level:

3. Level: This is a voltage value. In order to refresh the signal that is displayed in the graph, it needs to reach the voltage level in Normal mode.

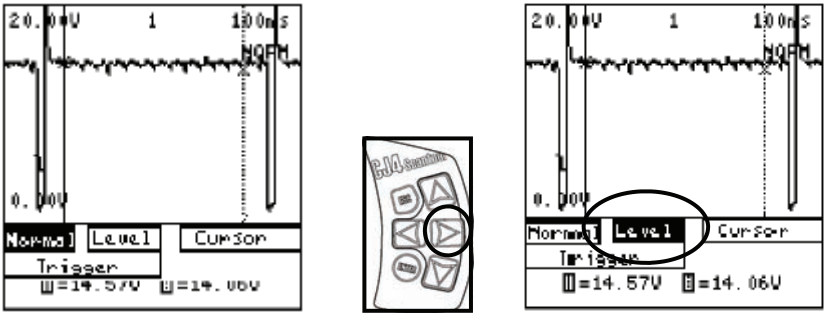
To adjust the trigger, press the RIGHT arrow key once the time scale has been adjusted (see previous section), press ENTER again to display the trigger options (Auto - Normal), using the UP and DOWN arrow keys make your selection and press ENTER. While in Normal mode, the word NORM will appear at the top right corner, bellow the time scale value.

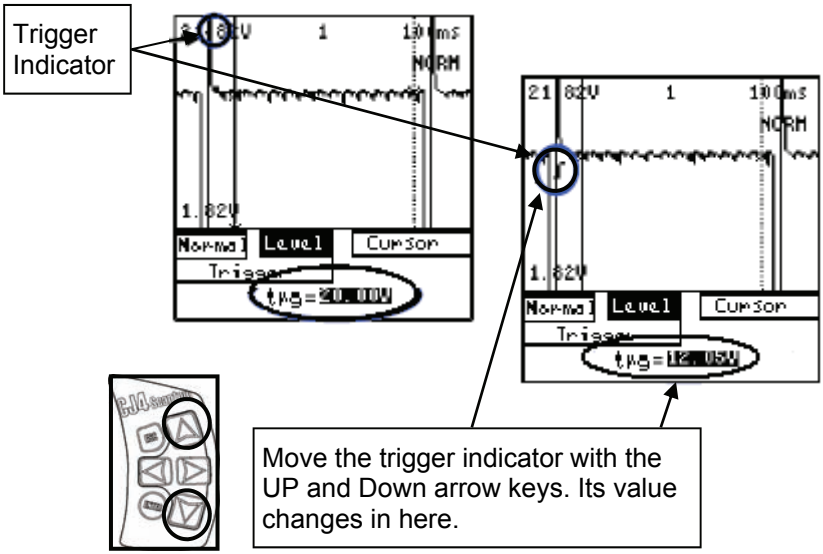


Level

Once the trigger has been selected, the next adjustment is the trigger voltage level.

Press the RIGHT arrow key when in the trigger mode screen, this highlights the Level button, press ENTER. The indicator will move in the graph to the trigger point and the value will be displayed at the bottom. The indicator can be moved up or down with the UP and DOWN arrow keys, and its value will change accordingly.



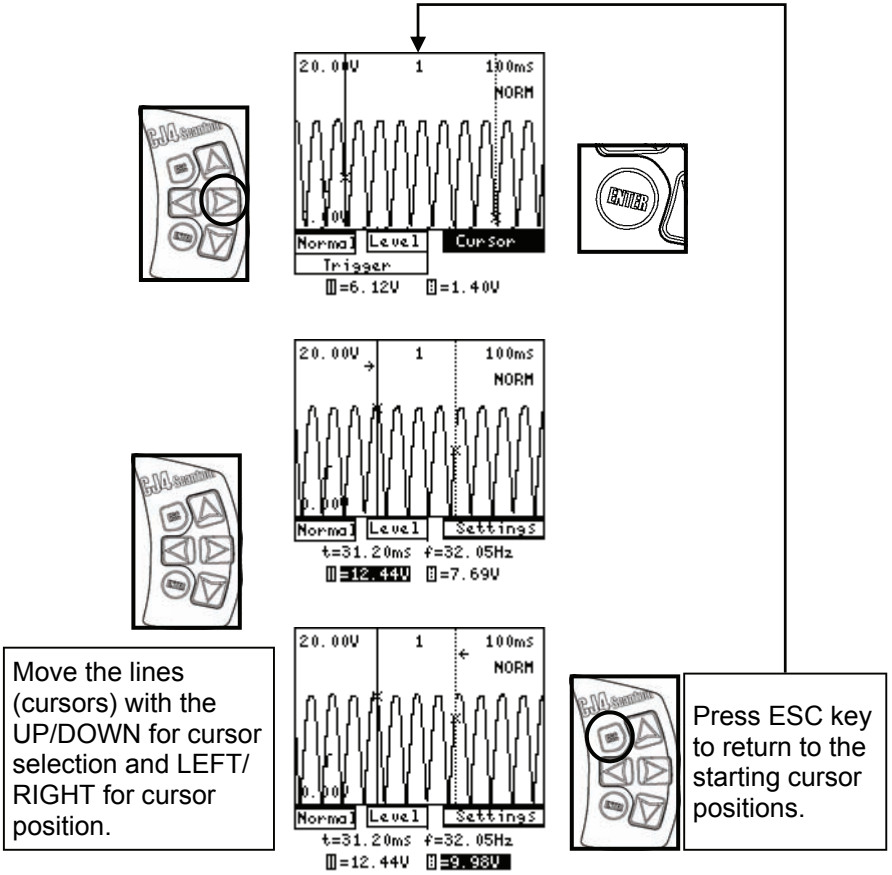


Cursor

With this option you can make active the cursors in the graph with the time and the frequency between them. This option is different then the one in the HOLD feature (see page 61) which “freezes” the display, here the cursors are used in real time to see the values of each cursor.

You can disable this feature and return to its initial state also.

Press the RIGHT arrow key to highlight the Cursor button and press ENTER, the word **Cursor** changes to **Settings**. Now with the UP/DOWN and LEFT/RIGHT arrow keys, move the position of each cursor and display the value of each at the bottom of the screen.



Wave Forms

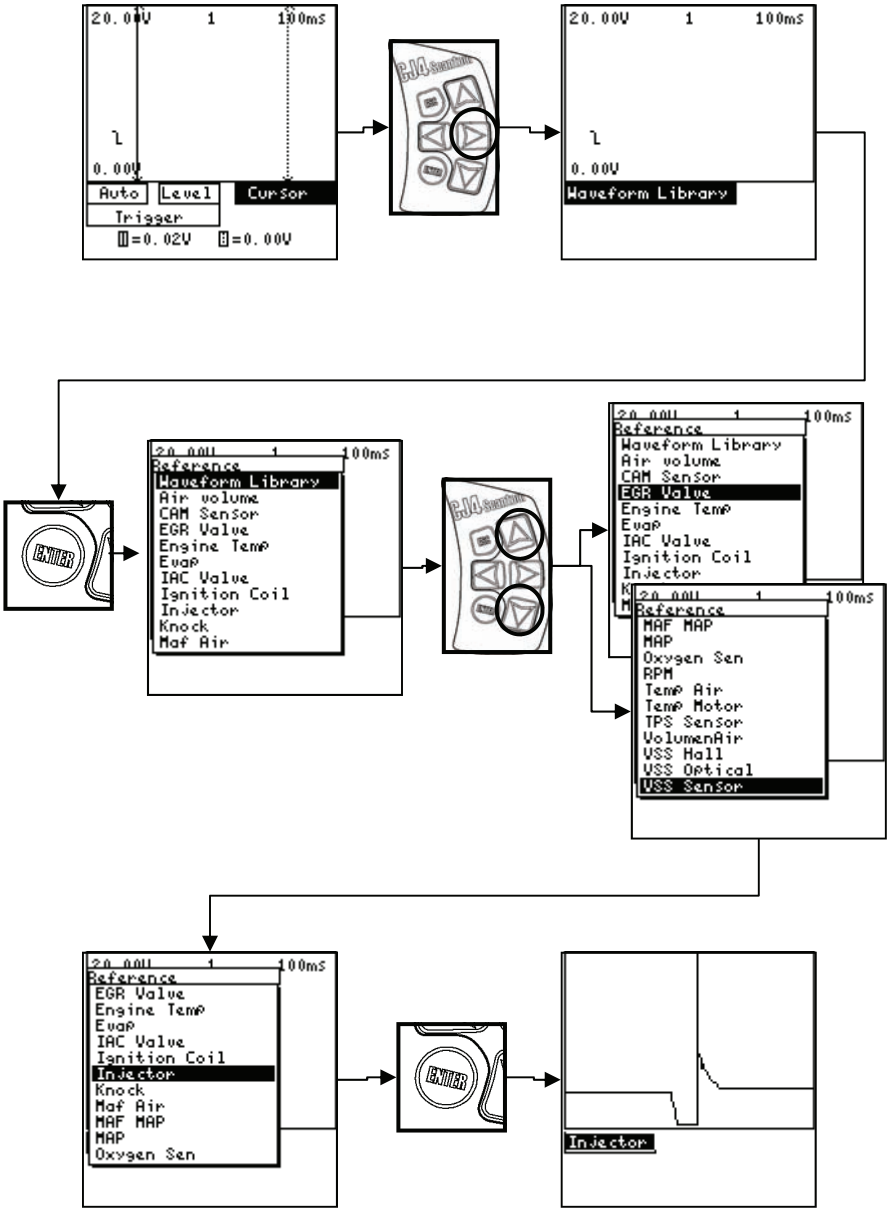
A selection of electrical wave forms of the most common automotive sensors and actuators is available in this function of the CJ4.

The main purpose of this feature is to give the user of the Labscope a reference of the ideal wave form for each of the elements in this list.

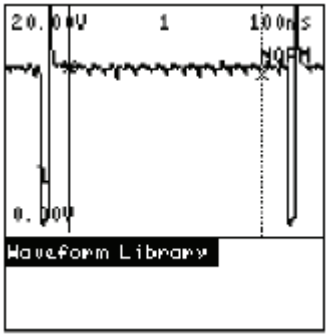
To access this information, press the RIGHT arrow key while still in the Cursor settings from the previous section, the **Waveform Library** screen appears. Press ENTER to display the list of available sensors and actuators. Using the UP and DOWN arrow keys, scroll to the item that you want and press ENTER, the wave form for that sensor or actuator will be displayed.

This is a list of the wave form graphics available in the CJ4:

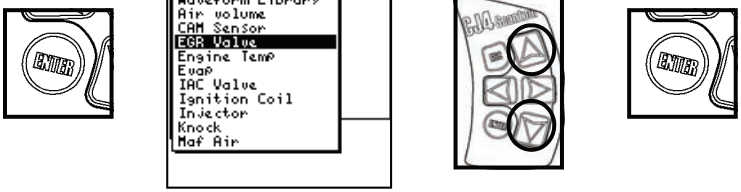
- ABS
- CAM sensor
- Crank sensor
- EGR valve
- Evaporative control valve
- IAC valve
- Ignition Coil
- Injector
- Knock sensor
- MAF
- MAF/MAP
- RPM
- Air Temperature
- Engine Temperature
- TPS sensor
- Air Volume
- VSS Hall type
- VSS Optical type
- VSS sensor


20.00V 1 100mS
0.00V
Auto
Level
Cursor
Trigger
=0.02V =0.00V
20.00V 1 100mS
0.00V
Waveform Library
ENTER
Reference
Waveform Library
Air volume
CAM Sensor
EGR Valve
Engine Temp
EvaP
IAC Valve
Ignition Coil
Injector
Knock
Maf Air
MAF MAP
MAP
Oxygen Sen
RPM
Temp Air
Temp Motor
TPS Sensor
VolumenAir
VSS Hall
VSS Optical
VSS Sensor
Injector

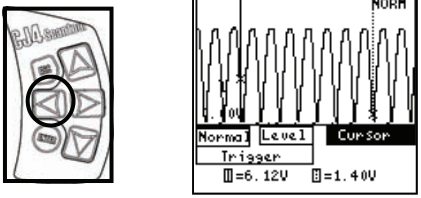
To return to the live graph, press ESC twice and the screen will look like this.



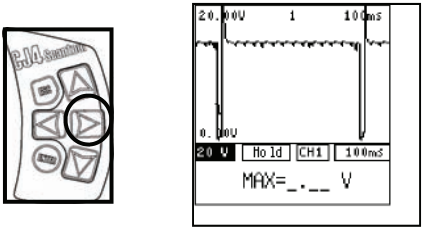
From here you have three choices;
1. return to select another sample wave form,



2. return to the live graph with the adjustments already done or



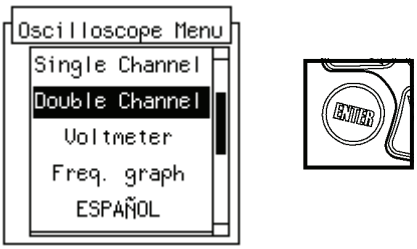
3. return all the way to the single channel settings screen.

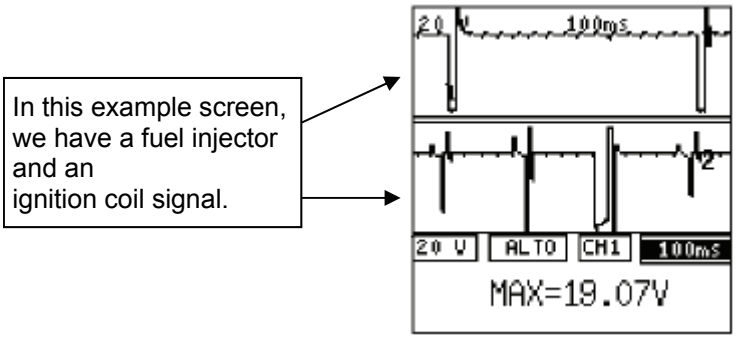


DOUBLE CHANNEL

This function allows the CJ4 Oscilloscope to display two graphic wave forms at the same time, with the same advantages of the single channel mode

Before starting with this application, is recommended that the test leads are connected into the CJ4 and the BLACK lead to a good ground as described in page 56 then the Red and Yellow leads to the components that you are testing. The RED lead is for channel 1, while the YELLOW lead is for channel 2.





All of the adjustments are the same as for the single channel display.

Note: The option to display wave forms is not available in the double channel setting due to screen viewing area limitations.

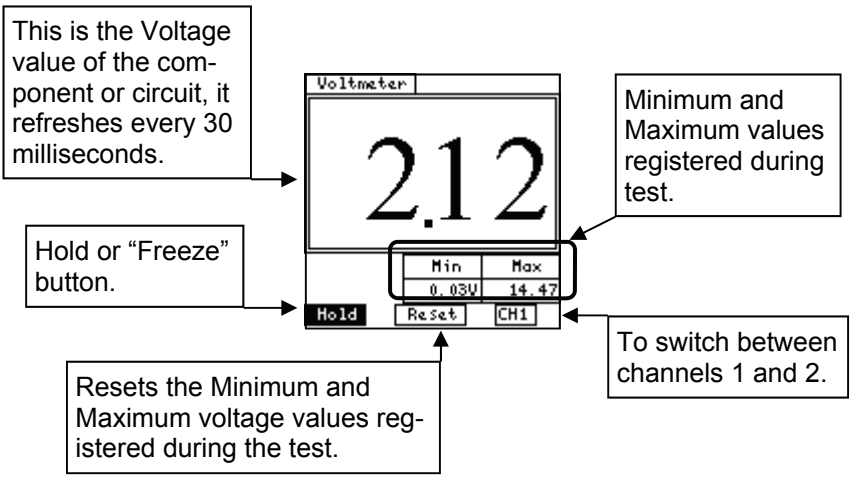
VOLTMETER

Another function that is included in the CJ4's Oscilloscope feature is a Voltmeter. Useful to measure voltage to automotive electrical circuits.

Highlight **Voltmeter** in the Oscilloscope menu and press ENTER.

The Labscope takes voltmeter readings from channel 1 by default, although, you can use channel 2 just by switching to channel 2.

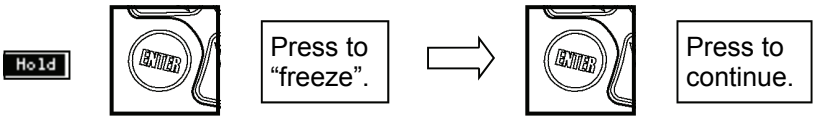
Remember to always connect the BLACK lead first to the negative side of the circuit or component being tested, then, the RED to the positive side. If channel 2 is going to be used, either, instead of channel 1 or to another source, connect the YELLLOW lead also (remember to switch between channels).



Hold

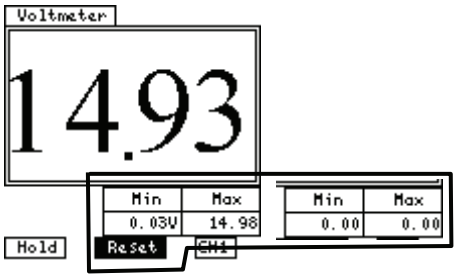
The Hold function “freezes” the data on the voltmeter screen. Since the Hold button is already highlighted when the voltmeter is accessed, just press ENTER.

To continue, press ENTER again.



Reset

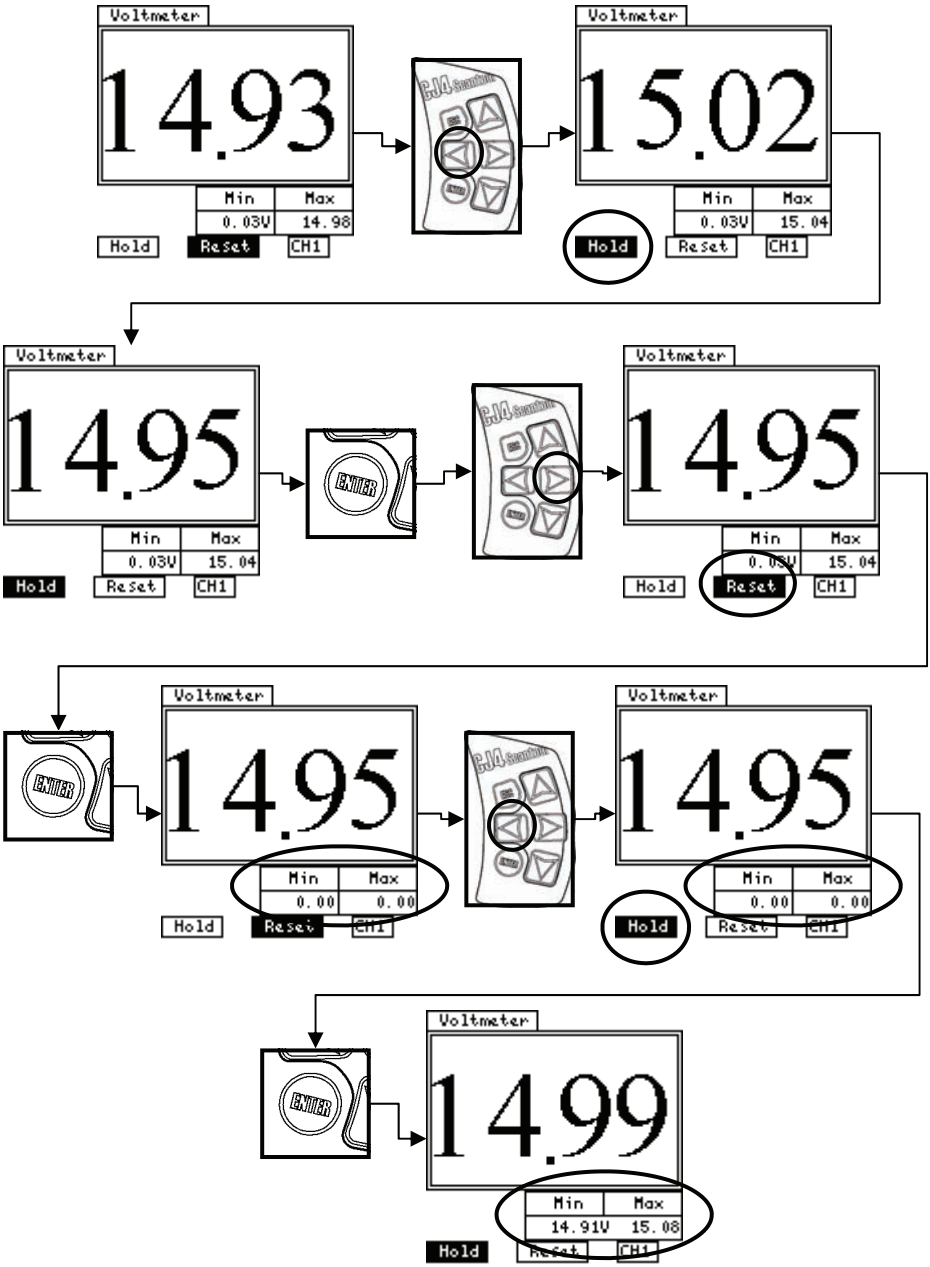
This button resets the Minimum and Maximum voltage values registered during the test. Since the screen refreshes every 30 milliseconds the reset to zeros is almost unnoticed.



An option that permits to actually see that the values have been reset is to freeze the screen and then reset the value, this is done by pressing the LEFT arrow key to highlight the Hold button and then press ENTER. Then press the RIGHT arrow key to highlight the Reset button again and press ENTER, the values will become 0.00s (zeros). Now press the LEFT arrow key to return to the Hold button and press ENTER, this “unfreezes” the screen and returns to displaying live data, notice the Minimum and Maximum values have changed and will continue to change every time the values go below the Minimum and above the Maximum.

The following graphics illustrate the procedure.

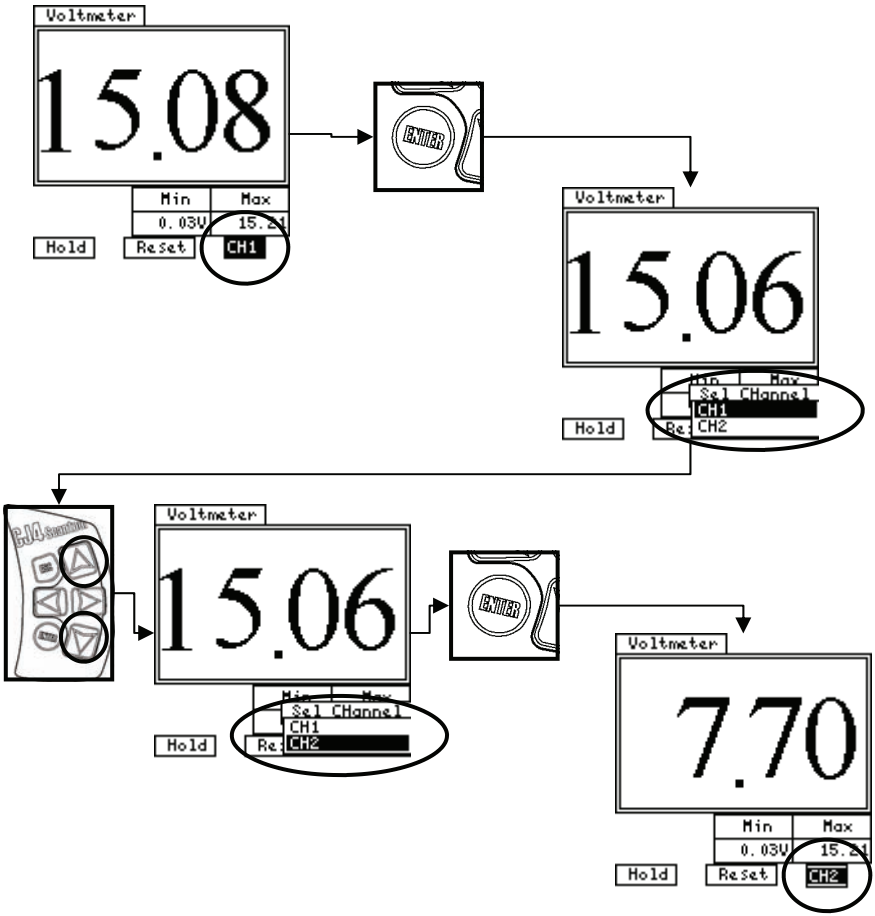
Min-Max values Reset feature



Channel

In the same way that in the Labscope Single Channel function, the Voltmeter can be set to display data from either channel, each individually.

Once the Voltmeter function is accessed, connect the test leads to a source; BLACK to ground, RED to positive for channel 1 and/or YELLOW to positive for channel 2.



FREQUENCY GRAPH

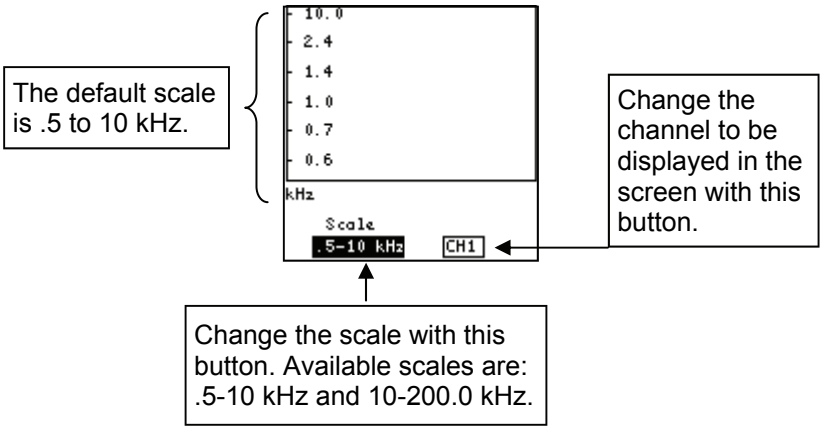
With this option, the CJ4 Labscope can display a real time graph of electrical signals, in a choice of two scales, from either of the two selectable channels.

This type of display is useful for sensors that generate a “square” signal or sine wave.

First, connect the test leads, BLACK to a physical ground (-). Then, the RED (channel #1) or/and the YELLOW (channel #2) to the sensor(s).

With the UP or DOWN arrow keys select **Freq. graph** and press ENTER.

Here is a description of the screen that appears:

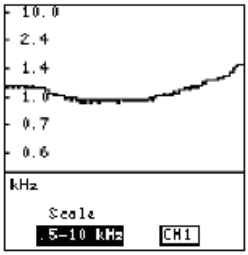


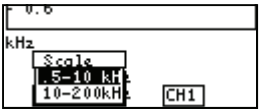
Modifying the scale.

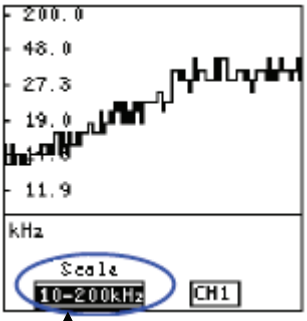
There are sensors that generate a faster signal then others or have a variable frequency like speed changes (RPM).

This is why the two scale options are offered, the default of .5-10 kHz and an alternate of 10-200.0 kHz.

To make this change press ENTER when the Scale button is high-lighted. Then the two available scales will be displayed, use the UP or DOWN arrow keys to make the change and press ENTER. The screen will display the change.







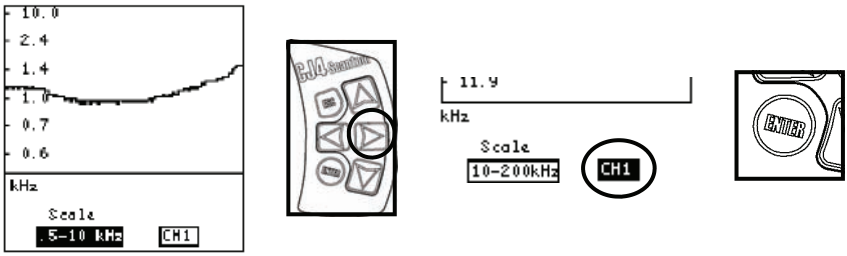
In this screen the graph looks different due to the change in frequency (speed), making the graph more clear. To return to the previous setting, repeat the same steps.

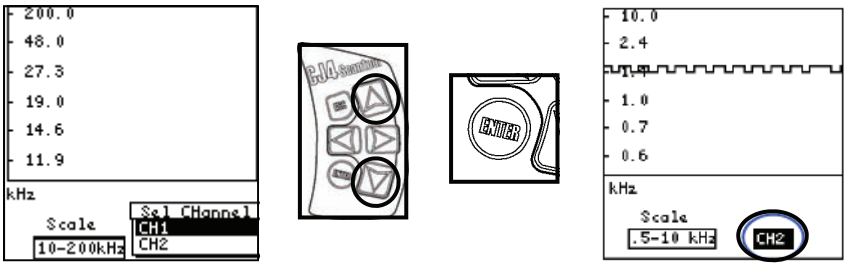
Changing channel.

If you are analyzing two separate signals, you can switch between channels just by making this change in the following way.

Press the RIGHT arrow key to highlight the **CH1** window, then press ENTER. The CH1 and CH2 submenu will be displayed, use the UP or DOWN arrow keys to make your selection and press ENTER.

Remember two things:
-1, the BLACK test lead needs to be connected to a good ground and,
-2, in order to make sure that you are looking at the correct component on each channel, the RED test lead needs to be inserted into the RED connector in the CJ4, as well as the YELLOW into the YELLOW in the CJ4.
It is not necessary to have the YELLOW test lead connected into the CJ4 if it is not going to be used.

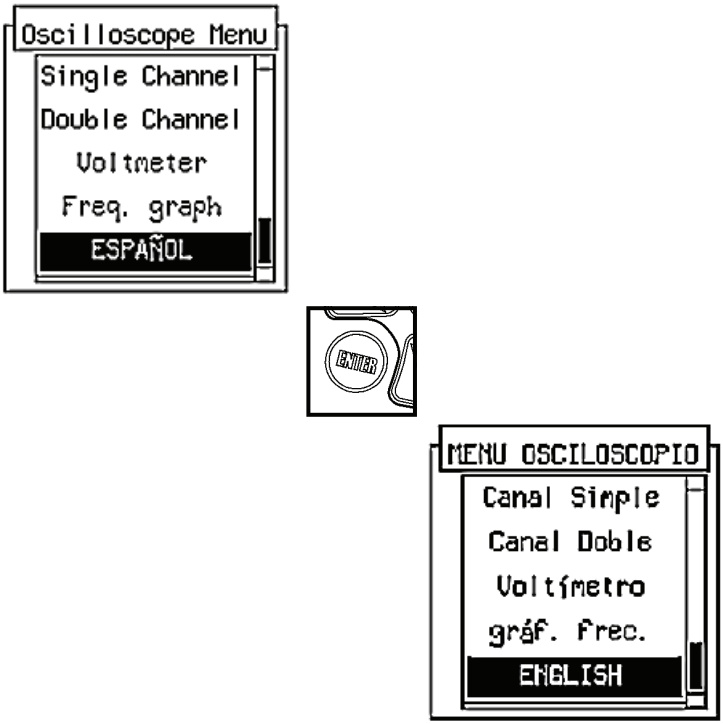




Español.

The CJ4 is bilingual and this feature is also available in the Oscilloscope function of the Scantool.

To change language just press ENTER when you have highlighted Español in the Oscilloscope Menu. The screen will change automatically to all Spanish language; Oscilloscope Menu, Submenus and functions.



Screenshots reminder.

The CJ4 has the ability to take screen shots of the information being displayed on the screen, in practically all of the functions.

Screen shots are very easy to take;

- To take a screen shot when in the Labscope option, you need to press the LEFT and RIGHT arrow keys at the same time, the "Screen Shot taken" message window will appear on the screen.

- When you are working in either the OBDII GENERIC or Battery Tester functions, just press the Down key for 2 seconds, on any diagnostic screen then, a window will appear with the message:"Screen Shot ready".

The screen shots will be stored in the memory of the CJ4 Scantool in a progressive manner, the CJ4 will assign a number that is consecutive, without regards to which function (OBDII Generic, Battery Tester or Labscope) they were taken from.

To manage the images stored in the CJ4 consult the section "Screen shots" in this manual.

BATTERY TESTER

The CJ4 Scantool/Oscilloscope incorporates support for the 4514 Battery Tester. This battery and electrical test accessory is used to perform electrical charging system output measurements, starting system draw and battery condition; test batteries with 250-850 cold cranking amps (CCA, CA, EN and DIN ratings compatible); is safe, simple and accurate, and is patented field proven Midtronics technology.

TECHNOLOGY

This Battery and Electrical System Test Accessory, was made by INJECTOCLEAN in compliance with MIDTRONICS technology.

This technology is based in a test known as Conductance Test, that is capable of measuring the conductance surface in the plates inside the battery, this is a determining factor in the battery's capacity to supply power. When a battery ages this surface looses active material or "sulfates", reducing the capacity to generate current.

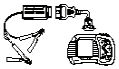
This method is fast, accurate and easy to determine the overall condition of the battery.

BATTERY MANAGEMENT INNOVATION

Focused on the development and marketing of innovative technologies for battery management, Midtronics has changed industry standards and practices. The company's history of advanced battery-related research and patented technologies has been tailored for a variety of applications, including transportation (automotive, heavy-duty trucking, off road), stationary (telecommunications, and uninterruptible power) and motive power, and military use.

The development of progressive products has positioned the company as a leader in the industries it serves.

NOTE: THE 4514 BATTERY TESTER IS NOT INCLUDED WITH THE CJ4, IT IS AN OPTIONAL ITEM AND IS SOLD SEPARATELY.



Integrated Solutions.

As the transportation industry evolves, Midtronics is working with vehicle manufacturers and electrical system suppliers focused on the development of advanced electrical systems. Midtronics' revolutionary inGEN™ system monitors battery state of health (SOH) and state of charge (SOC) to control charging and loads, thereby improving fuel economy and vehicle reliability. Further, Midtronics has developed an integrated battery monitor--onGUARD.

The Intra Technologies division of Midtronics is a premier producer of power management solutions used to improve the reliability, efficiency and cost of DC power systems.

All of Intra Technologies' products utilize a proprietary, patented MOSFET semiconductor switch, which can manage extremely high electrical current while generating very small amounts of heat in a very cost and size efficient packaging.

Intra's superior solid-state products provide protection from battery power loss, over current, overheating, short circuit and other power issues encountered in vehicle applications.

This division is a critical element in Midtronics' overall Integrated Solutions offerings, providing additional technologies that can be combined with the effective battery and electrical system diagnostic capabilities of inGEN™ and onGUARD to create active power management solutions.

- **WARNING:** Before using this electrical device make sure you read all instructions in this manual.

- **The use of personal safety equipment is recommended when working with batteries. Failure to comply with the safety recommendations may result in an accident involving fire, risk of electrical shock, or serious personal injury.**

- Make sure you handle the equipment as recommended by the manufacturer handling procedures to avoid the risk of an accident or a malfunction of the product.

- ELECTRICAL: To avoid the risk of electrical shock do not disassemble this product.

- Use only accessories recommended by INJECTOCLEAN.

- SERVICE: Service must only be performed by Injectoclean repair personnel. Service or repair by unqualified personnel may result in risk of injury, damage to the equipment, and may void your warranty. Refer to the Product Warranty Policy section of this manual.

HANDLING PROCEDURES

Make sure when using the Battery Tester to use only the approved cables as recommended by the manufacturer.

Keep your Battery Tester dry, clean, and free from oil and grease. Use a clean cloth to wipe the outside of the equipment when needed

INTRODUCTION

The Battery Tester is an add on accessory that enables your CJ4 Scantool/Oscilloscope to determine the state of health of 12-volt batteries.

Using this technology the Battery Tester can detect weak batteries before they fail.

This Battery Tester also performs tests in the starting and charging systems and is easy to setup and use.
The Battery Tester comes with cable clamps that attach to the vehicle's battery terminals and the other end of the module plugs onto the OBD II connector of your CJ4 Scantool/Oscilloscope.

BATTERY CONDUCTANCE TESTER FEATURES

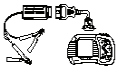
- Test batteries rated at 250 CCA to 850 CCA.

- Battery rating systems:
  -CCA
  -CA
  -DIN
  -EN

- Battery test results displayed:
  -Voltage
  -CCA
  -Battery Condition:
  *Good
  *Good Recharge
  *Charge & Retest
  *Replace Battery
  *Bad Cell-Replace

- Starting test results displayed:
  - Voltage
  - Starter System OK or FAIL. Check Wiring and Starter.

- Charging test results displayed:
  -Voltage
  -Charging System OK or FAIL. Check Wiring and Starter.



PREPARATIONS PRIOR TO TESTING THE BATTERY.

Testing Out-of-Vehicle

Clean the battery posts or side terminals with a wire brush. When testing side-post batteries, install and tighten the lead terminal stud adapters. **Failure to properly install the stud adapters, or using stud adapters that are dirty or warn, may result in false test results. Do not use steel bolts.**

Testing In-Vehicle

Turn off engine and all accessory loads. **Testing with the ignition switch on or vehicle loads on, will cause inaccurate readings.**

VERY IMPORTANT

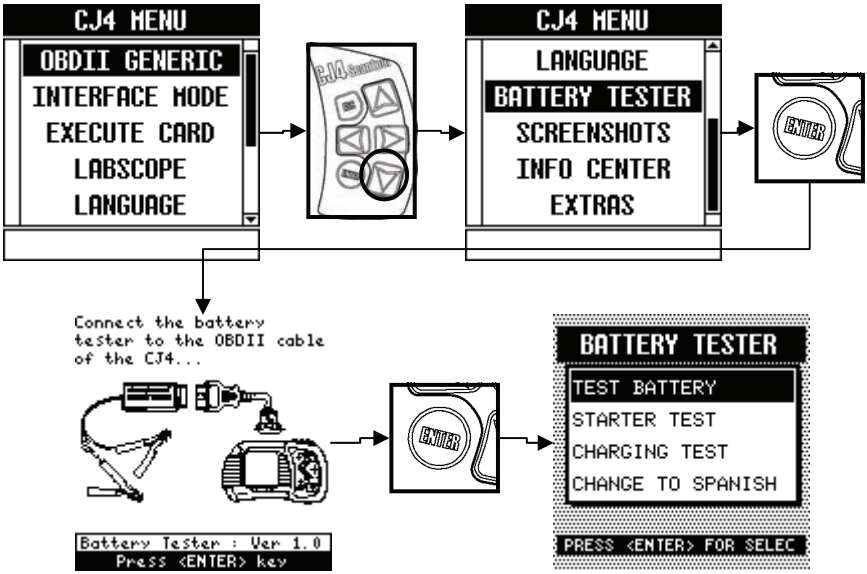
If the vehicle was running before testing, turn on the headlights for 30 seconds to remove the battery's surface charge. Let the battery rest for 1 minute to recover before testing.

OPERATING INSTRUCTIONS.

Connect the battery tester clamps to the battery on the car. Make sure you place the clamps correctly; positive (red) and negative (black) directly to the battery posts.

Connect the OBD II connector from the CJ4 Scantool to the Battery Tester.

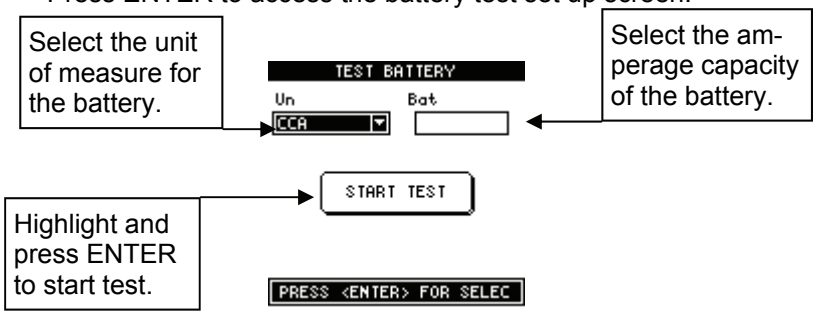
The screen of the CJ4 will power up and display the CJ4 MENU, using the DOWN arrow key scroll to **BATTERY TESTER** and press ENTER. The illustration of how to connect the battery tester will appear, then press ENTER to access the **BATTERY TESTER MENU.**



TEST BATTERY

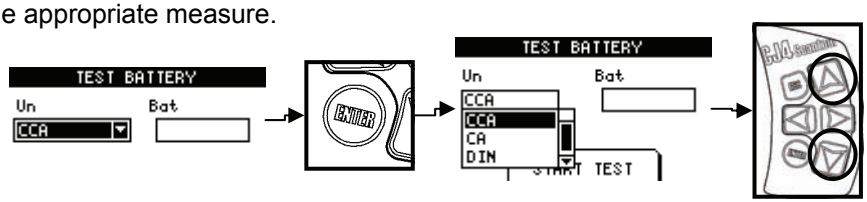
With this test, you can determine the percentage of useful life in the battery, as well as the amperage capacity and the voltage available.

Press ENTER to access the battery test set up screen.



Selecting the amperage units of measure.

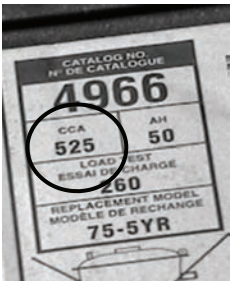
Since the Unit of measure window is already highlighted when this screen is accessed, just press ENTER to display de dropdown menu to select the appropriate measure.



With the UP and DOWN arrow keys, select the unit of measure and press ENTER.

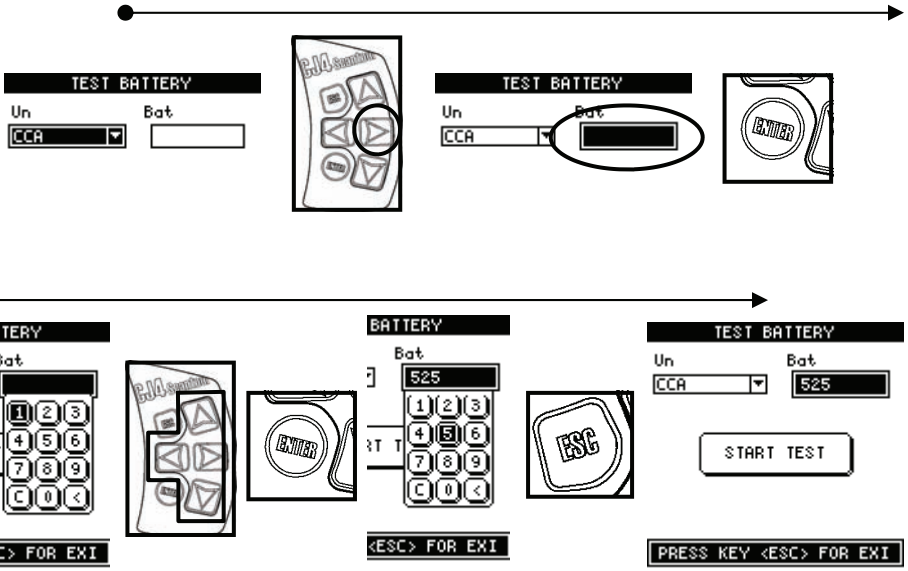
Setting the amperage rating.

The amperage rating usually is found on a tag or sticker in the battery, this number value is going to be entered in the amperage rating window.



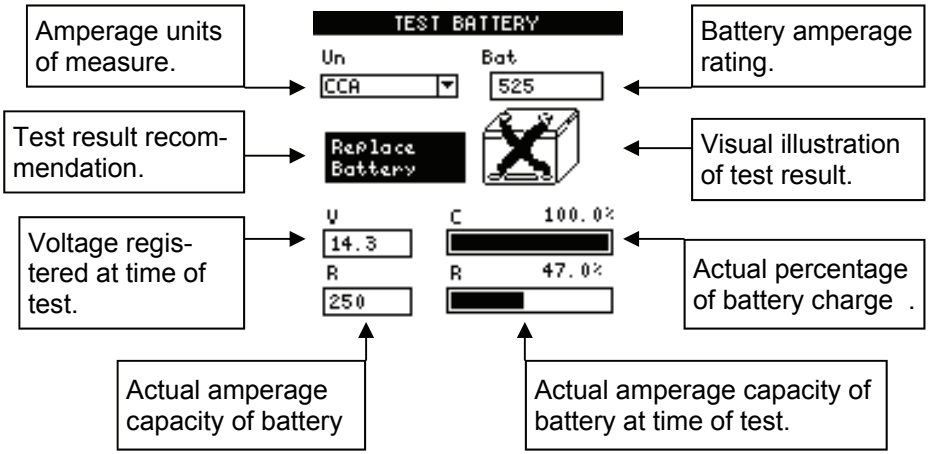
Use the RIGHT arrow key to highlight the amperage capacity window and press ENTER. A numbers key pad will be displayed, using the UP/DOWN and LEFT/RIGHT arrow keys, highlight the first number of the battery amperage rating and press ENTER. Again with arrow keys, select the next number and press ENTER, then do the same for the third number.

After all the numbers have been selected, press ESC to lock the value in the window.



Press the DOWN arrow key to highlight START TEST and press ENTER. The test will be performed by the module and the CJ4, in a few seconds the results will be displayed in the screen.

The following is an example of test result screen and explanation of displayed components.



Remember that in order to perform an accurate test some preparations need to be done first, please refer to the “Preparations prior to testing the battery” in the Battery Tester section of this manual.

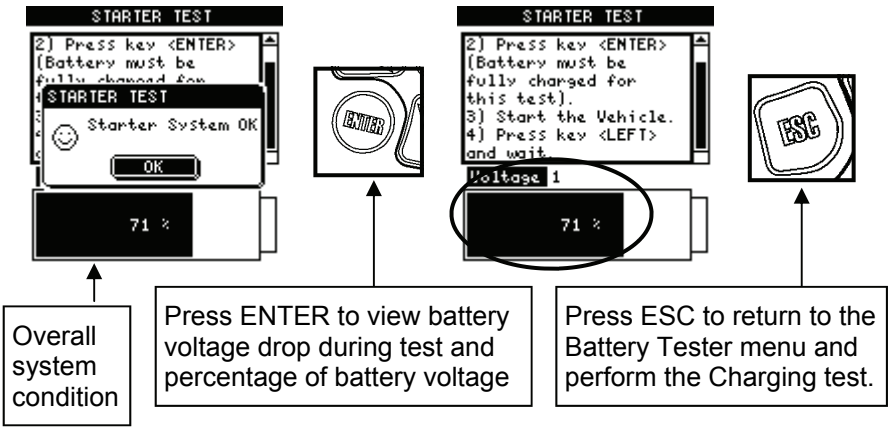
STARTER TEST

With this test you will be able to have an overall result of the starting system condition. Components in this system that may cause it to fail the test are; battery, terminals and cables, starter and mechanical problems in the engine.

With the 4514 clamps connected to the battery (Red to positive and Black to negative) and the Battery Tester function accessed in the CJ4, use the DOWN arrow key to highlight STARTER TEST and press ENTER.
Test instructions will appear, they are as follows;

1) Connect the tester clamps to the battery,
2) Press key <ENTER>
(Battery must be fully charged for this test).
3) Start the vehicle.
4) Press key <LEFT> and wait.

After a few seconds the test result will appear in the screen.



CHARGING TEST

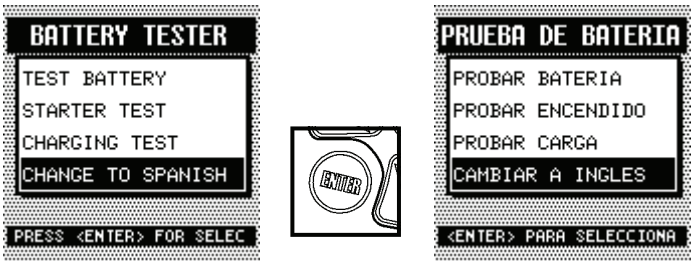
The Charging test verifies that the charging system is working and displays the voltage available to the electrical system in the vehicle. (It does not measure how much amperage is being generated by alternator).

Normally a charging system is working properly if the voltage registered in the test is within 2 Volts over the starting voltage before the test. Anything below the starting or above 2 volts over indicates a problem, possible causes are: alternator, regulator, loose accessory belt, wiring or electrical problem, battery.

DOWN arrow key and highlight CHARGING TEST and press ENTER. Instructions screen reads:

1) Connect the tester clamps to the battery.
2) Press key <ENTER>
(Battery must be fully charged for this test).
3) Rev the engine at 2000 rpm for 15 seconds.
4) Press key <LEFT> and wait.

After a few seconds the results appear in the screen.



CHANGE TO SPANISH

To change language, highlight CHANGE TO SPANISH and press ENTER, all the Battery Tester menu and functions will be displayed in Spanish to return to English just press ENTER.

Screenshots reminder.

The CJ4 has the ability to take screen shots of the information being displayed on the screen, in practically all of the functions.

Screen shots are very easy to take;

- When you are working in the Battery Tester function, just press the Down key for 2 seconds, then a window will appear with the message:“Screen Shot ready”.

The screen shots will be stored in the memory of the CJ4 Scantool in a progressive manner, the CJ4 will assign a number that is consecutive, without regards to which function (OBDII Generic, Battery Tester or Labscope) they were taken from.

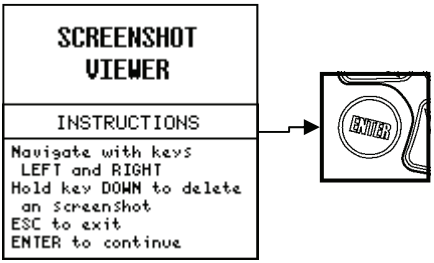
To manage the images stored in the CJ4 consult the section “Screen shots” in this manual.

SCREENSHOTS

The SCREENSHOTS feature on the CJ4 Scantool/Oscilloscope allows the capture of data that is being displayed in the screen during engine diagnostics or electrical system tests. You can review this screenshots in the screen of the CJ4 Scantool/Oscilloscope or transfer them to a PC or Laptop, were you can review and even manipulate them with the Screen Shot Converter.

Highlight SCREENSHOTS in the CJ4 Menu and press ENTER.

The SCREENSHOT VIEWER screen is displayed with instructions.



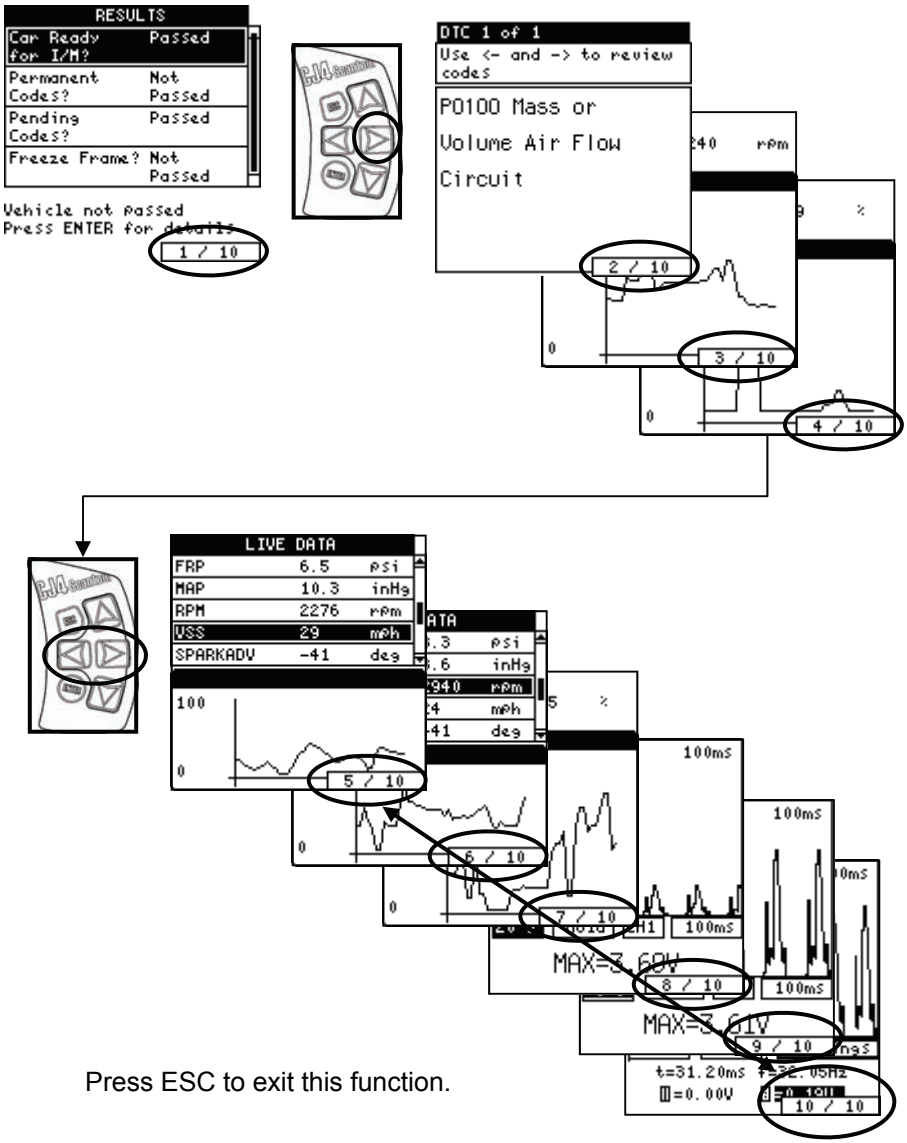
In the following illustration sequence we are going to view 10 saved screenshots, then we are going to delete 2.

Notice that as we view the screenshots, the numbers at the bottom right hand of the screen indicate the number of the one in view and how many are saved. Then, when we delete 2 of them the total number saved changes.

To start viewing the screenshots press ENTER while on the Screenshot Viewer screen.

VIEWING SCREENSHOTS

Press the RIGHT arrow key to review the screenshots.
Press the LEFT arrow key to return to the previous screenshot.



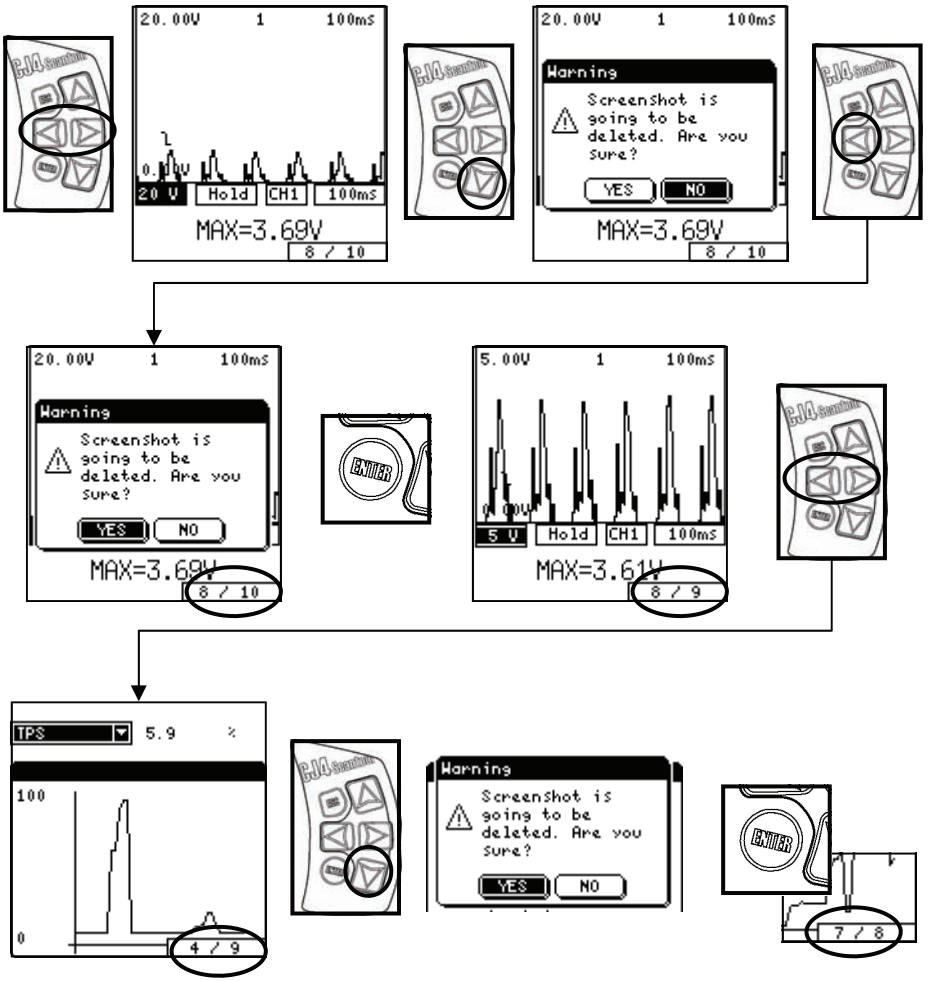
Press ESC to exit this function.

DELETING SCREENSHOTS

Press the LEFT or RIGHT arrow keys to select the screenshot that you want to delete, then press the DOWN arrow key for about 2 seconds and a message window will appear.

If you are sure that you want to delete this screenshot, press the LEFT arrow key to highlight the YES button and press ENTER.

The screenshot gets deleted and the total number of saved screenshots changes.



Press ESC to exit this function.

-Transferring Screen Shots.

On this section we will learn how to transfer screen shots, captured by the CJ4, into your PC. Refer to “Screen Shots” section in this manual.

It is recommended to create a folder with the title “Screen Shots” to save your transferred files and utilize it for that purpose only.

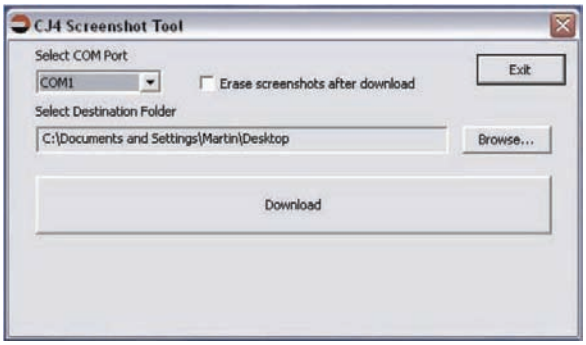
Icon of folder created for the specific purpose of storing transferred screen shots from the CJ4 Scantool.

First verify that the “CJ4 Screenshot Tool” program is installed in your PC. Refer to the installation instructions for “Driver” and “PC software”, in the CD that was included in the CJ4 storage case or downloads from the Injectronic web site.

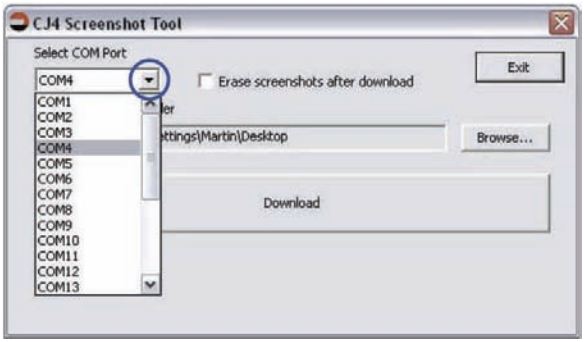
If the “CJ4 ScreenshotTool” program is installed, you should see this icon on your computer’s screen.

Once the program is installed, connect the CJ4 to the PC with the USB cable, as described in the “Interface Mode, USB” section of this manual.

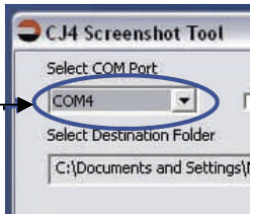
Open the “CJ4 Screenshot Tool” program, the following window appears in your PC desktop.



On the upper left corner, there is a window under the heading “Select COM Port”, click on the arrow to display the ports available in your PC, select the one that was assigned when you did the installation of the USB Driver. Refer to the installation instructions of the driver.

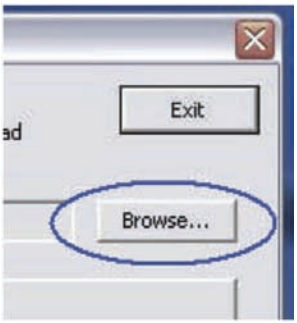


Once selected, it will appear in the window.



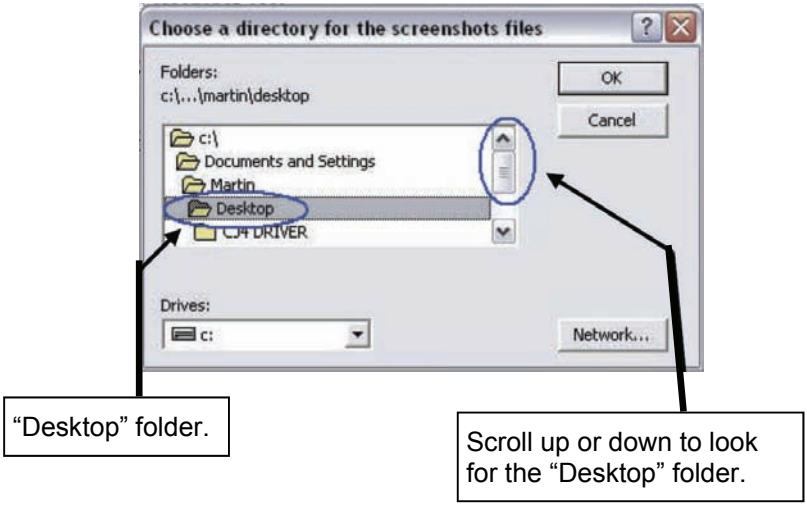
Now, select the location were the screen shot will be saved.

Press the “Browse” button.

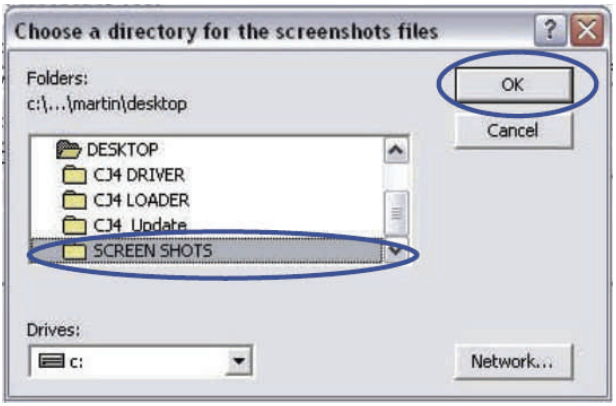


The list of possible locations in the PC hard drive will appear.

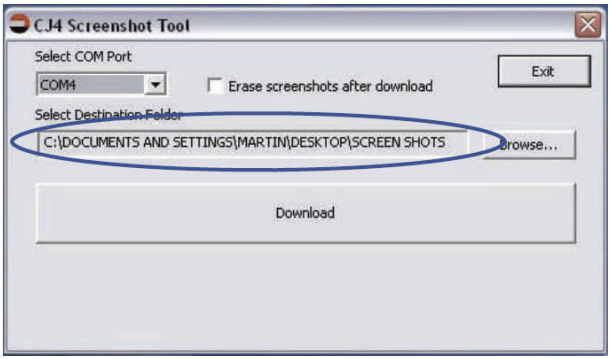
In our example we created a folder in the desktop, highlight the “Desktop” folder.



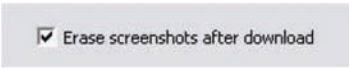
Inside the “Desktop” folder, look for the “Screen Shots” folder.



Press OK once the Screen Shots folder has been highlighted, the next window confirms the location were the screenshots will be saved.

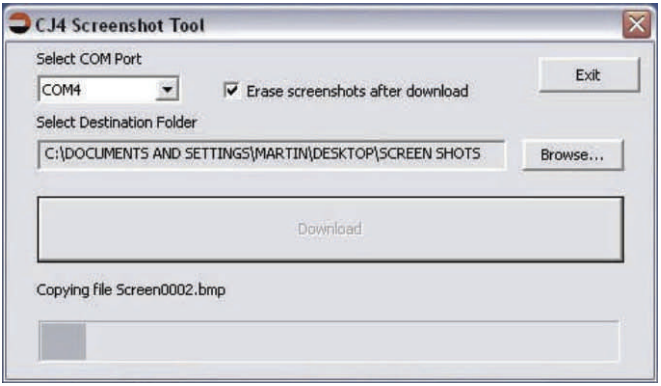


If you prefer to erase the screen shots saved in the CJ4 after they have been transferred, click inside this window to check mark that option.

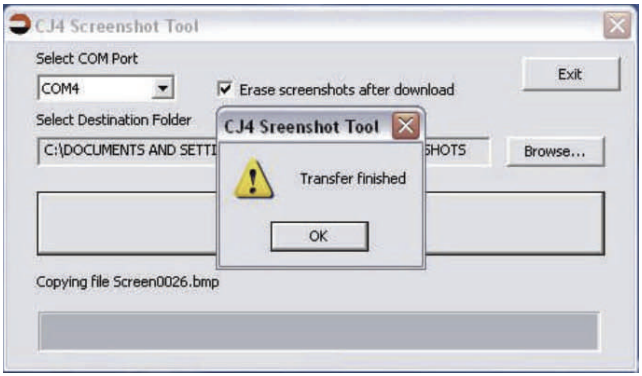


If you opted to erase the screenshots in the CJ4, they will be deleted after the transfer has finished, this clears memory in the CJ4.

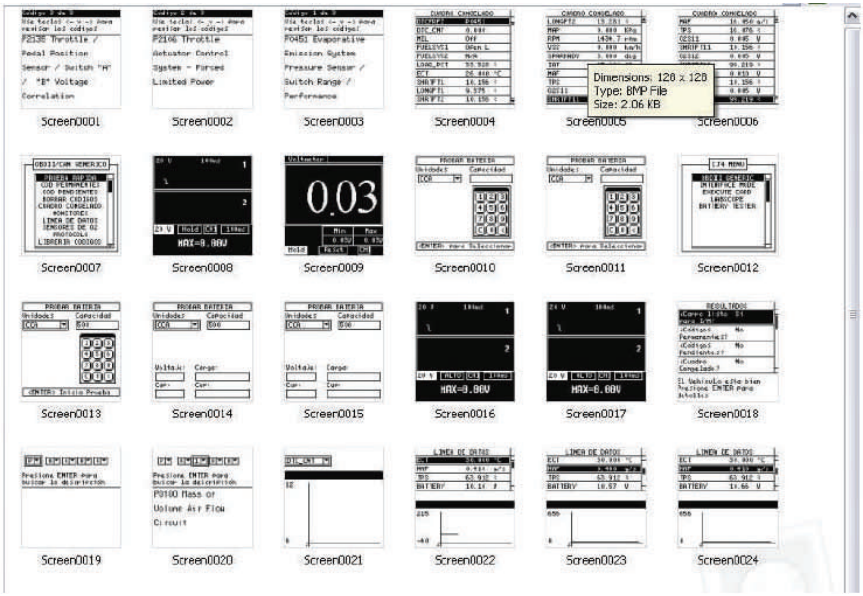
Press the “Download” button to start transferring the saved screenshots from the CJ4 to your PC. The time needed varies depending on the amount of files that are getting transferred. At the end of the transfer, the files are erased from the CJ4 memory.



When the transfer and erasure of files, if selected, has finished, you will see this confirmation window. Press OK, then EXIT.



The screen shots are saved in BMP format.
This window is how they appear in the “Screen Shots” folder.



Double click on any icon to open in another program.

INFO CENTER

In the INFO CENTER there are two helpful features and a setting.

- ACRONYMS

There are about 800 descriptions of the most commonly used OBD II automotive acronyms in the CJ4 Scantool/Oscilloscope.

- CONNECTOR FINDER

Location of the DLC (Data Link Connector) of more than 1600 models is available in this feature, in a graphic and indicating if this connector is behind a cover, like an ashtray.

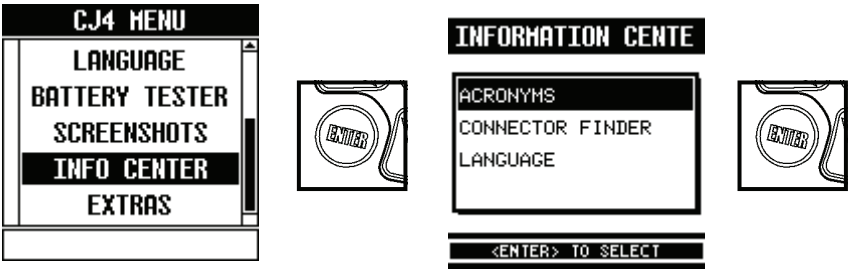
- LANGUAGE

The Language setting allows the user to change to Spanish language all of the acronym and connector finder screens.

ACRONYMS

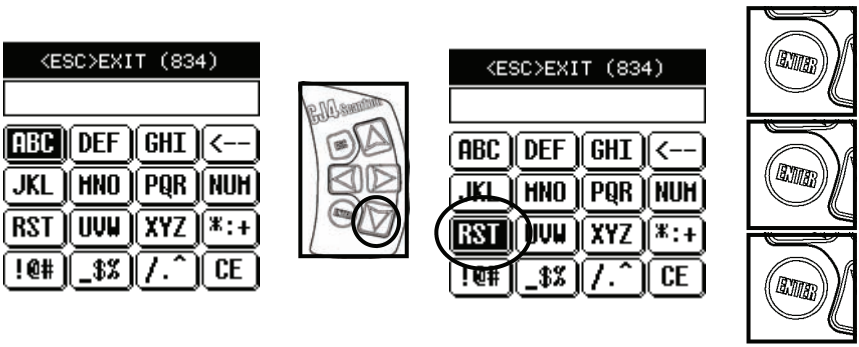
Acronyms are abbreviations of the different components and/or systems in an automobile, as set by SAE standards.

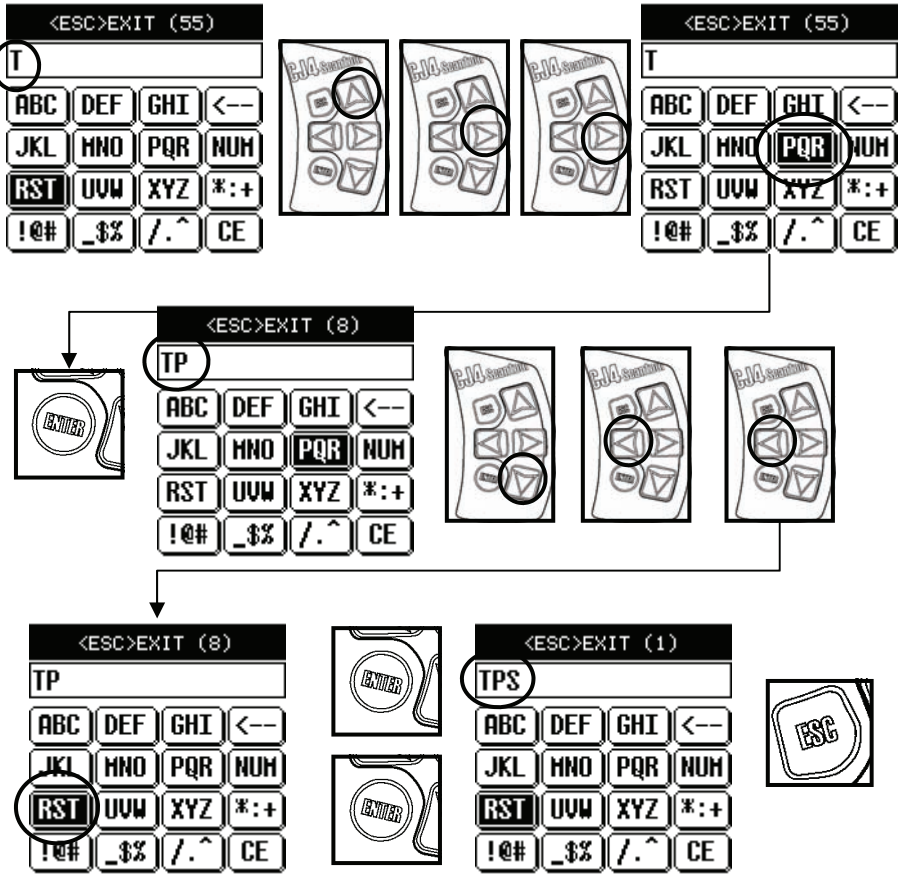
To access this function, press ENTER once the INFO CENTER is highlighted in the CJ4 Menu. The information center menu appears, and acronyms is highlighted by default, press ENTER.



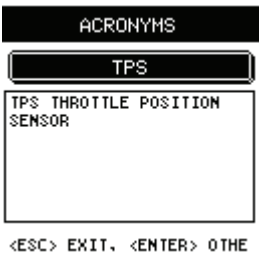
A key pad appears in the CJ4's screen. It's functionality is very similar to telephone key pads, to select the desired letter you press the same key one to three times, after about 2 seconds, the letter is set and the cursor moves to the next space.

In the following example we are going to look for the description for the TPS acronym.





After the ESC key has been pressed, the TPS description is displayed



Press ESC to exit

If no description or the letters don't match the available data, this window will appear, press ENTER to exit.

Press ENTER to search for another acronym.

Additional key functions

Aside from the “Alpha” (letters) keys, there are other keys that have additional functions.

The BACK arrow is used to delete a character from the screen.

Highlight this key by moving with the UP/DOWN and LEFT/RIGHT arrow keys and then pressing ENTER as many times as needed to delete.

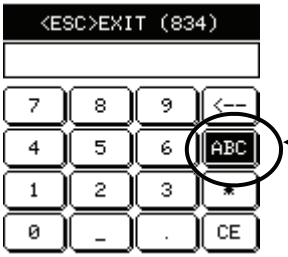
****

The NUM key allows access to the numbers key pad.

Highlight this key in the same way than for the other keys, with the arrow keys, then press ENTER, the key pad changes to number keys.

Navigation on this keys is the same as with the letters.

To return to the letter key pad, highlight the **ABC** key in the number key pad and press ENTER.



To return to the Alpha key pad, highlight the ABC key and press ENTER.

****

The CE key is used to delete all of the characters in the screen.

Highlight this key and press ENTER to delete every character that is in the display window.

At this time the special character keys are not used.

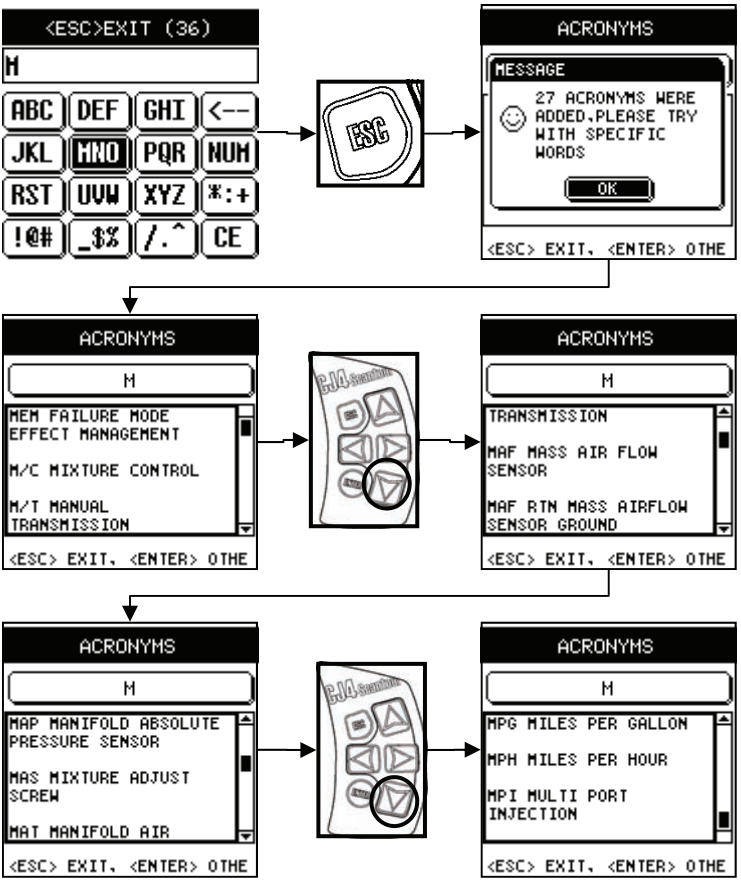
Alphabetized acronyms

This feature gives the user the ability to search acronyms by the first letter, in other words, if you don't know all the initials for the acronym but you know the first letter, this allows a search by that first letter.

Following is a step by step illustration of how to use this feature.

Once you have accessed the acronym search function, enter the first letter of the acronym to be searched and press ESC.

A list of all acronyms that start with that letter will be displayed, to view all available descriptions, scroll with the DOWN arrow key.



CONNECTOR FINDER

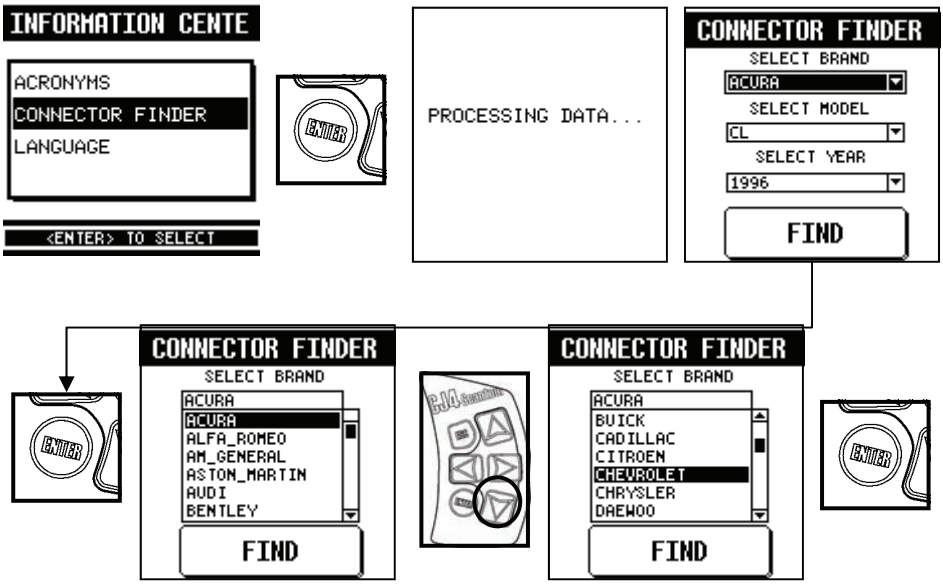
The second feature of the Info Center is a Connector Finder. Location of the OBD II diagnostic connector (DLC) for most vehicles 1996 to date is available here in a diagram illustration with text describing the location and special details, like if it is behind an ashtray.

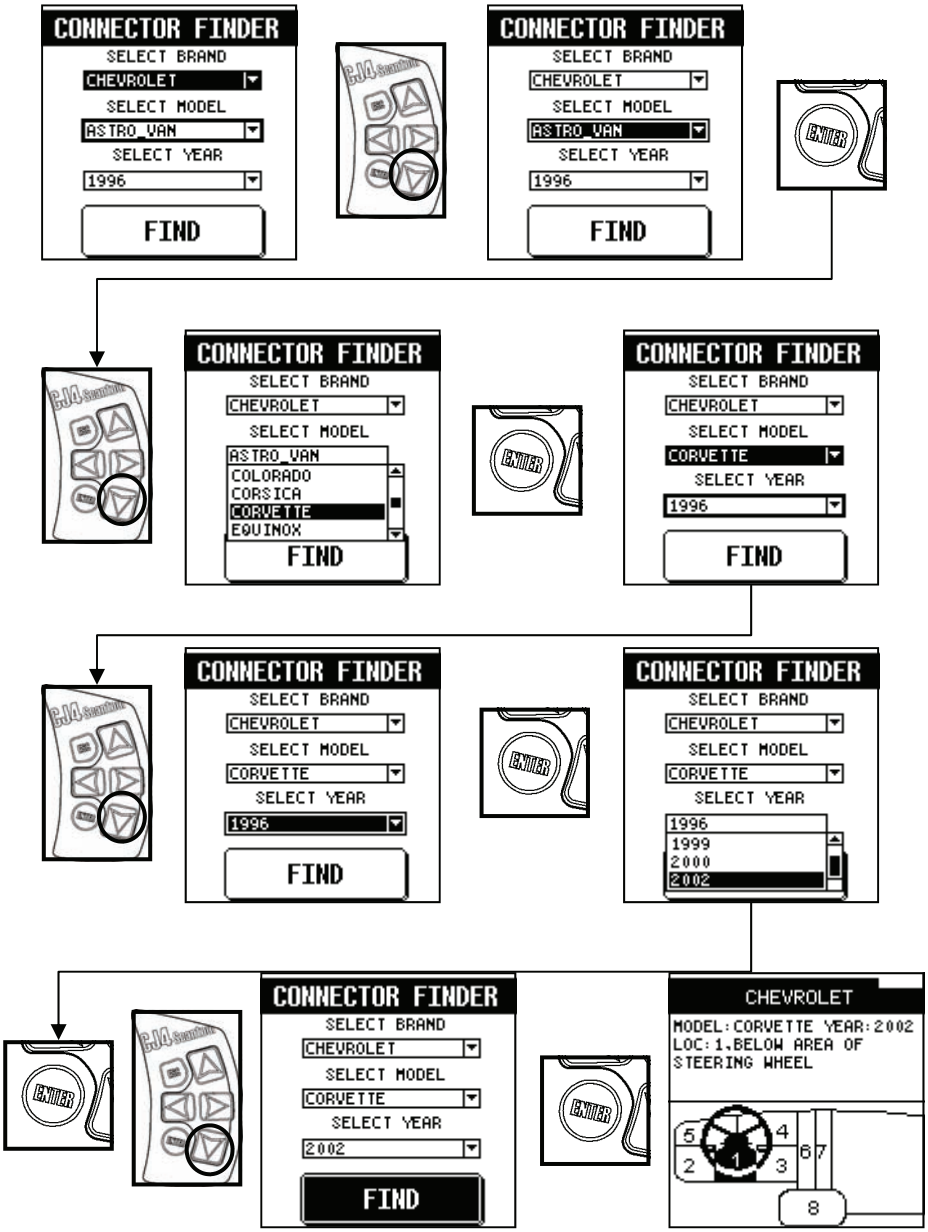
Access the Connector Finder function and press ENTER. The connector finder vehicle selector screen will be displayed.

The window at the top is to select the vehicle make, it is highlighted when this screen appears, press ENTER. A drop-down list is shown, with the DOWN arrow key highlight the vehicle make and press ENTER.

Next, with the DOWN arrow key highlight the model window and press ENTER, highlight the model in the list and press ENTER.

Last, select the year from the list in the select year window and press ENTER, then with the DOWN arrow key highlight the FIND button and press ENTER. The next screen will show a diagram and text describing the location of the DLC for that vehicle.





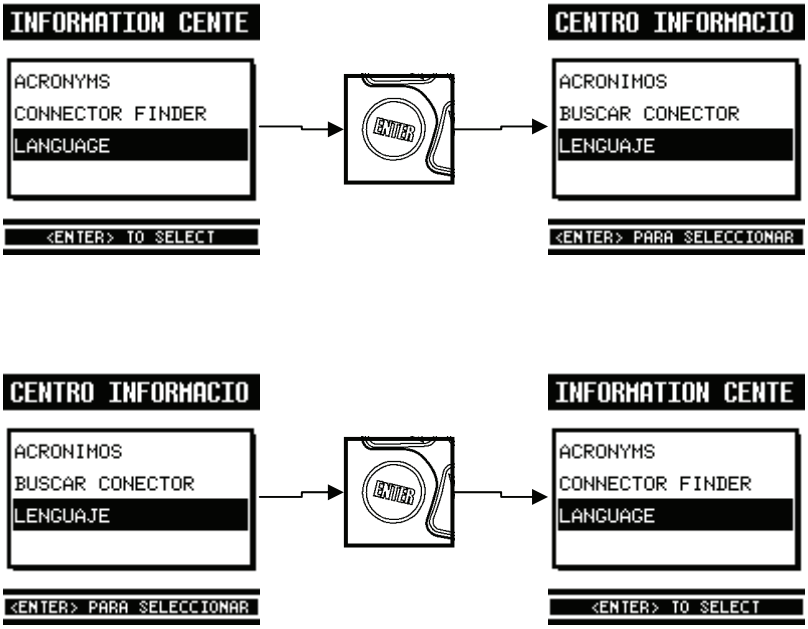
Press ESC to exit this function.

LANGUAGE

As with all of the features and functions of the CJ4 Scantool/ Oscilloscope, the info center can be accessed in Spanish also.

To change the language, highlight LANGUAGE in the information center menu and press ENTER. The screen will be displayed in Spanish, the Acronyms and Connector Finder functions will also be in Spanish.

To return to English, just press ENTER when LENGUAJE is highlighted.



Screenshots reminder.

The CJ4 has the ability to take screen shots of the information being displayed on the screen, in practically all of the functions.

Screen shots are very easy to take;

- When you are working in the Information Center function, just press the Down key for 2 seconds, then a window will appear with the message: “Screen Shot ready”.

The screen shots will be stored in the memory of the CJ4 Scantool in a progressive manner, the CJ4 will assign a number that is consecutive, without regards to which function (OBDII Generic, Battery Tester or Labscope) they were taken from.

To manage the images stored in the CJ4 consult the section “Screen shots” in this manual.

Warranty.

INJECTRONIC guarantees this product (including any accessories) for a period of ONE YEAR against defects in materials and workmanship as follow:

- **Workmanship: For a period of ONE YEAR from date of purchase, if it is determined that this product is defective, INJECTRONIC will repair or replace the defective product.**
- **Parts: INJECTRONIC will provide at no additional cost, a replacement o reconditioned parts in exchange for the defective items. After the warranty period, you are responsible for payment of damaged parts.**
- **Accessories: INJECTRONIC will replace the defective accessories with new items.**

To obtain warranty services, the product needs to be sent prepaid, in the original package or comparable with the same grade of protection to INJECTRONIC.

This Warranty DOES NOT cover cosmetic defects or damage caused by events out of our control, to include: accidents, falls, exposure to heat, damage while in transit out of service, alterations or repairs not authorized or errors, while following instructions, intentional damage. This guarantee will not cover damages caused by its operation, improper maintenance, voltage surge or any repairs not authorized by INJECTRONIC.

THE PURCHASE RECEIPT IS YOUR EVIDENCE OF THE DATE OF PURCHASE, AND IT NEEDS TO BE SENT BY FAX OR SCANNED, NO LATER THEN 30 DAYS AFTER THE PURCHASE IS MADE, TO REGISTER YOUR PRODUCT AND OBTAIN WARRANTY SERVICES.

IN CASE THIS REQUIREMENTS ARE NOT MET, THE COST OF SERVICE OR REPAIRS SHALL BE COVERED BY THE CUSTOMER.

This warranty is void if the product serial number applied at the factory has been altered or removed.

For more information or warranty questions, please contact us at:
support@injectronic.com